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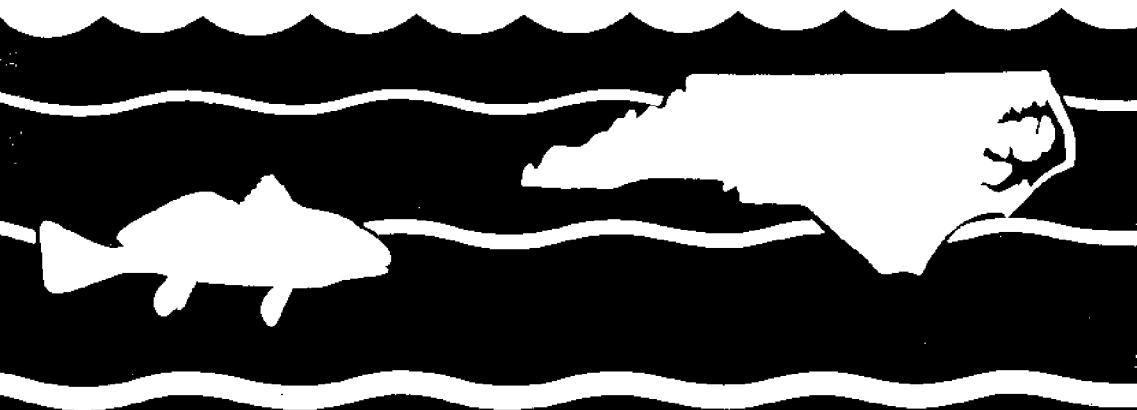
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Public Opinion On Insect Pest Management In Coastal North Carolina

**R. R. GERHARDT, J. C. DUKES, J. M. FALTER
and R. C. AXTELL**



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Public Opinion on Insect Pest Management in Coastal North Carolina

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North Carolina State University, Raleigh, N. C.
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TABLE OF CONTENTS

PREFACE	1
GENERAL SUMMARY.	7
SURVEY RESULTS FOR CARTERET COUNTY	9
Summary	9
Introduction	10
Results	13
SURVEY RESULTS FOR PAMLICO COUNTY	23
Summary	23
Introduction	25
Results	26
SURVEY RESULTS FOR PENDER COUNTY	31
Summary	31
Introduction	33
Results	33
DISCUSSION	39
APPENDIX I - SAMPLE SURVEY	43
APPENDIX II - CARTERET COUNTY	47
APPENDIX III - PAMLICO COUNTY	62
APPENDIX IV - PENDER COUNTY	72

PREFACE

Control of the biting flies and mosquitoes affecting man and animals in coastal and estuarine zones is a difficult task, but is frequently necessary to prevent disease transmission and to provide relief from attack for the citizens and segments of the economy, especially the tourist and recreation industries. The extreme ecological importance of these areas make it essential that the populations of these insect pests be managed by methods that are compatible with the estuarine ecosystem. Many of the biting flies and mosquitoes breed in the marshes which support an abundance of marine life and are a source of nutrients. Ecologically sound insect control in this situation requires the judicious meshing of different methods (chemical, cultural, biological) into a program of pest management.

The term "pest management" denotes an approach to the reduction of a pest problem in which decision-making is based on consideration of what is ecologically and economically in the long-term best interest of mankind. Inherent in the concept is an orientation to the entire pest population in a large area. The objective is to lower the mean level of abundance of that population by methods or a combination of methods which supplement the natural control agents, give long term alleviation of the problem, and cause the least disruption of the ecosystem. It is based on the realization that natural pest populations can not be eliminated; rather they must be managed so that they occur at tolerable levels.

The concept of pest management is in contrast to the more general practices of insect control which are based on immediate, short-term alleviation of a problem in a localized outbreak. This approach to pest control was fostered by the availability of synthetic chemical insecticides. The ad hoc control programs using these chemicals have led to environmental contamination, deleterious effects on non-target organisms and severe problems of insect resistance to the agents. Likewise,

certain cultural practices, such as ditching and filling of marshes for mosquito control often have been practiced for the immediate short-term benefit of a locality with inadequate consideration of the long-term effects. Short-term ad hoc control practices have been inadequate and must be replaced by pest management programs as rapidly as possible.

In the coastal and estuarine ecosystems, management of the biting fly and mosquito populations must take into account the long-term importance of these systems to mankind not merely the short-term demands of the public or of a segment of the economy. A management program will require measured and selective use of chemical and cultural practices tailored to local conditions and applied in a manner to supplement the natural control agents. The object will be to suppress the pest population below the level of economic importance to man with minimal interference with the estuarine ecosystem.

A pest management program adequate for meeting society's demands for control of biting flies and mosquitoes will incorporate some selective use of insecticides, strategic ditching and impoundment of marshes, personal protection procedures, and biological control agents (parasites, predators, and pathogens). Prerequisites to planning the proper mix of these methods is research on the ecology of the pests in relation to the individual methods and local conditions. Such research is in progress in North Carolina by personnel of the N.C.S.U. Department of Entomology with support of the N.C. Sea Grant Program and the N.C. Agricultural Experiment Station.

Development of the technical and scientific bases for a pest management program must be accompanied by a socio-economic component. Inherently, a management program must involve a large area and be conducted by some public agency (county government, state government, "abatement" district). Consequently, public demand and support for an insect pest management program are equal in importance to the technical and scientific aspects. Both are prerequisites for a successful program.

Therefore, we have undertaken a survey of public opinion on the insect (biting flies and mosquitoes) problems in selected coastal areas of

North Carolina. The survey was conducted in the counties of Carteret, Pamlico and Pender. Respectively, these counties had 1971 travel expenditures of \$7,390,000, \$670,000 and \$1,860,000. Overall, the coastal counties of North Carolina had 1971 travel expenditures of \$62,880,000.¹ This reflects, but does not accurately convey, the great economic significance of the tourist and recreation industry in these counties. Adequate management of the biting flies and mosquitoes is an important consideration in the enhancement of that economic resource.²

The survey results show substantial public support for improved community insect control. The public attitude indicates a favorable climate for the institution of pest management procedures.

This report of the study is being presented in the hope that it will encourage interested parties (civic organizations, county commissioners, governmental agencies) to investigate further the possibilities for establishing insect pest management programs in various coastal areas. The North Carolina General Statutes (Art. 24, Ch. 130) provide mechanisms for administering and funding such programs. Scientific and technical information for these programs is extensive and improvements will be made as the results of further research are obtained. Although additional research is greatly needed it would be desirable to utilize more fully what is known to-date. Considerable technical and scientific advice is available from agencies such as the N.C. Department of Health, N. C. Department of Natural and Economic Resources and N. C. State University (Agricultural Experiment Station and Agricultural Extension Service).

¹Copeland, L. and L. Copeland. 1972. 1971 North Carolina Travel Survey, and Economic Analysis. Travel and Promotion Division, Department of Natural and Economic Resources.

²North Carolina Marine Science Council. 1972. North Carolina's Coastal Resources. A preliminary planning report for marine and coastal resource development in North Carolina. Department of Administration, Raleigh, N. C.

Insect pest management programs should be carefully conceived and incorporated into overall coastal management. Land-use policy and planning should take into account the extent and sources of biting flies and mosquitoes. In pestiferous localities it may be possible to avoid the need for insect control by land-use policies which will prevent high densities of people. Where this can not be accomplished, insect pest management programs should be incorporated into the planning and considered a hidden cost (monetary and environmental) of development.

This report demonstrates that public opinion surveys can be very helpful in delineating the pestiferous areas most in need of attention. From such information, supported by subsequent on-site insect surveys, maps showing the degree of the insect pest problem and sources can be prepared. Although it would be a large undertaking, this should be done for the entire coastal zone as resource information for the initiation of insect pest management programs and for the planners and decisionmakers responsible for coastal zone development.

R. C. Axtell

18 January 1973

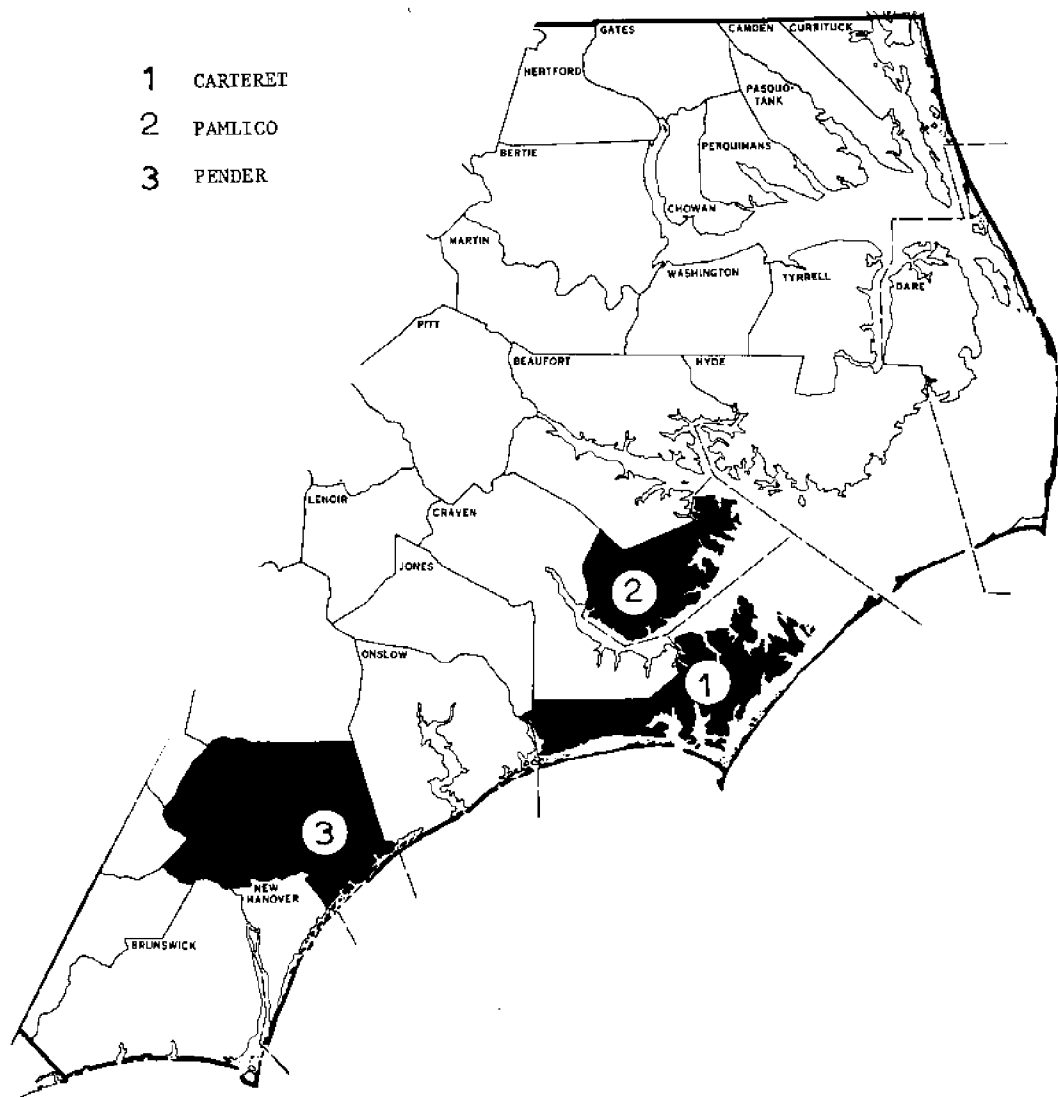


Fig. 1. Map of Coastal North Carolina

GENERAL SUMMARY

In August 1972, a survey was made in three coastal North Carolina counties (Fig. 1) to determine the public's opinion concerning biting insects. 3,643 questionnaires were distributed in these counties as follows: Carteret - 2,688, Pamlico - 527, and Pender - 428. The average response of 32.3% indicates a strong interest in this problem. There were some important differences from county to county but some general conclusions can be made from the responses.

- (1) A large majority of the respondents are bothered often by biting insects (Carteret - 79.1%, Pamlico - 71.3%, and Pender - 86.7%).
- (2) Mosquitoes are the most widespread and annoying pests in the survey counties. In some areas biting gnats or yellow flies are worse.
- (3) Even though mosquitoes are the major source of annoyance, most people felt that they are not as bad now as they were 10 to 15 years ago. Pender county is an exception to this.
- (4) Respondents from all counties felt that the other biting flies (yellow flies, biting gnats and greenheads) were the same or worse than they were 10 to 15 years ago.
- (5) About 80% of the respondents wanted more community effort devoted to biting insect control. Most of these people also expressed a willingness to pay for that control.
- (6) Most property owners thought that the value of their property would increase if there were fewer biting insects.

The results are remarkably similar for each county. It appears that biting insects have a major impact on the activities of many coastal residents. These residents have also indicated a real interest in supporting better control of these biting insects.

It is suggested that this type of survey be conducted in the entire coastal area and followed by insect surveys in critical localities in order to provide data for planning proper land-use and for initiation of pest management programs where needed.

SURVEY RESULTS FOR CARTERET COUNTY

SUMMARY

In August 1972 a survey was made in Carteret County, N. C. to determine how the public views the biting fly problem. 2,688 mail surveys were distributed in various parts of the county. A high percentage of these were returned (35.3% or 9.5% of all the households in the county).

From analysis of these returns, the following general conclusions can be made about the opinions of the respondents:

- (1) 4 out of 5 are bothered often by biting insects of various kinds.
- (2) Mosquitoes are the most widespread and annoying pests in the county, followed in order by; yellow flies, biting gnats and greenheads.
- (3) Even though mosquitoes are the worst pests in the area, 2 out of 3 thought that they are not as bad now as they were 10-15 years ago.
- (4) However, only 1 in 3 thought the other biting flies (yellow flies, biting gnats and greenheads) had improved in the last 10-15 years. Most felt they were the same or worse.
- (5) A large majority (84.2%) felt there was a need for more community effort devoted to the control of biting insects.
- (6) 81.4% of the respondents said they would be willing to pay some amount of money to support this community effort.
- (7) Most property owners felt that their property would increase in value if there was better control of biting insects.

INTRODUCTION

Carteret County is one of the outdoor recreational centers of coastal North Carolina, with a tourist industry valued at \$7,390,000.00 in 1971. The county has 531 square miles of land and 400 square miles of inland waters. There are 615 miles of tidal shore line. Of the 531 square miles of land, 100 square miles or 18.8% are wet lands, mostly salt marshes. These marshes are of great value in terms of fish, shellfish and wildlife. However, they are also the source of numerous biting flies that attack man and animals in the area. This survey was conducted to determine what opinions the people of Carteret County have about the effect of biting flies on their lives.

Extent of the survey:

The mail survey was conducted by six employees of N. C. State University between August 14 and 17, 1972. Due to limited resources, some areas of the county were not surveyed. The areas that were surveyed are as follows (Fig. 2):

- (1) Atlantic - Atlantic and Sea Level Township
- (2) Stacy - Stacy Township
- (3) Davis - Davis Township
- (4) Williston - Along U.S. 70, from Wade Rd., Symrna north to Williston and Jarrett Bay.
- (5) Symrna - Marshallberg - The remainder of Symrna Township, Marshallberg Township and the town of Gloucester in Straits Township.
- (6) Harkers Island - Harkers Island Township
- (7) Yucca Village - U.S. 70 east from North River to Harkers Island Rd.
- (8) U.S. 70 - Merriam Rd. - West side of North River from Shell Landing Rd. to Laurel Rd.
- (9) North Newport River - Millcreek Rd. east of Newport to the Newport River, Harlow Township and N. C. 101 from the Inland Waterway to Russel Creek Rd.
- (10) Newport - Town of Newport.



Fig. 2 Map of Carteret County

- (11) Country Club Rd. - In Morehead City - Country Club Rd. and Forest Hills Ave.
- (12) Crab Pt. - Crab Point Rd. and River Hts. area in Morehead City.
- (13) Mitchell Village - Morehead City area south of U.S. 70 and N.C. 24.
- (14) Cape Carterett - Town of Cape Carterett, Cedar Point, Bogue, Ocean and Wiggins Neck Rd.
- (15) Bogue Banks - Emerald Isle, Salter Path and Pine Knoll Shores.

Conduct of the Mail Survey:

In areas 1 - 6 the questionnaires were delivered by the U. S. Postal Service to the individual box holders. In the other areas (7 - 15) the questionnaires were placed in selected mailboxes by employees of N.C. State University.

The survey, as delivered, consisted of a three page questionnaire, a cover sheet and a return envelope with postage and the Raleigh address of Extension Entomology. All these were packaged in a 9" x 12" unaddressed envelope. The cover sheet (Appendix I) identified the source of the survey, requested the respondents help and gave a brief description of the biting flies most commonly encountered in the county. These groups of insects were:

- (1) Mosquitoes (*Culicidae*, several species)
- (2) Yellow flies (*Chrysops* spp: *Tabanidae*)
- (3) Biting Gnats (*Culicoides* spp: *Ceratopogonidae*)
- (4) Greenheads (*Tabanus* spp: *Tabanidae*)

Extent of the Personal Interview Survey:

In addition to the mail survey a personal interview survey was conducted with visitors and residents of Carteret County. A total of 77 interviews were made, divided among the areas as follows:

Area 15	Bogue Banks	32
Area 10	Newport	17
Area 11	Country Club Rd.	9
Area 13	Mitchell Village	7
Area 8	U.S. 70-Merriam Rd.	6
Area 14	Cape Carterett	3
Area 6	Harkers Island	1
Area 7	Yucca Village	1
Area 9	North Newport River	1

The results of the interviews cannot be considered as representative of the whole county, since most interviews were conducted either in urban areas or on Bogue Banks. In addition, the interviews were made between 10 a.m. and 5 p.m. during the working week and, of course, excluded people with regular jobs.

Conduct of the Interviews:

The interviewers chose dwellings at random in the area in which they were working at the time. The occupants were requested to participate in the survey after the interviewers identified themselves. When the subjects agreed, the interviewers read each question and recorded the answers on the questionnaire. Specimens of each of the types of insects were shown to the people participating. Question 11 unnecessarily lengthened the interviews, so it was not asked after the first day.

RESULTS

2,688 surveys were distributed in Carteret County. This represents 26.9% of the 9,996 households in the county. Of these 948 were returned by the respondents for a 35.3% return or 9.5% of the households. 45 of the surveys returned were incomplete or returned too late to be used in the analysis of the results. This left 903 usable returns for a 33.5% return rate. Table 1 of the Appendix II lists the number of questionnaires distributed and returned from each area.

The numbers and percentages given in this section for the answers to each question are the totals for all the areas in the county. For the numbers and percentages for each area, see Tables 2 through 30. The results of the interviews are not tabulated by area, due to the small numbers involved.

Question 1: How often are you bothered by biting insects out-of-doors?

Mail Response: Most responded that they were bothered often, 713 (79.0%). Of the rest, 152 (16.9%) responded they were sometimes bothered, 20 (2.2%) were seldom bothered and only 1 respondent was never bothered. 17 (1.9%) gave no response (N.R.).

Interview Response: More than half (57.1%) were bothered often, 29.9% were bothered sometimes and 13.0% were seldom bothered. None of the participants were never bothered.

Question 2: How often do each of the following insects bother you out-of-doors?

Mail Response:

Insect	very often		quite often		once in a while		hardly ever		N.R.	
	#	%	#	%	#	%	#	%	#	%
Mosquitoes	524	58.0	249	27.6	113	12.5	9	1.0	8	0.9
Yellow flies	263	29.1	261	28.9	266	29.5	65	7.2	48	5.3
Biting gnats	252	27.9	244	27.0	275	30.4	83	9.2	49	5.4
Greenheads	114	12.6	144	15.9	331	36.7	221	24.5	93	10.3

The answers to this series of questions indicate that mosquitoes, as a group, are the most widespread and consistently annoying pests in the county. More than 50% of the people from all areas, except Country Club Rd. and Mitchell Village, said they were bothered very often by mosquitoes. Each of the other groups of biting flies seemed to be less of a problem except in localized areas (yellow flies bothered more than 50% of the people very often in 4 areas, Table 4 of Appendix II). The biting flies, other than mosquitoes do constitute a serious problem throughout the county. 401 different respondents (44.4%) said they were bothered very often by one or more of these groups (yellow flies, biting gnats and/or greenheads).

Interview Response:

Insect	very often		quite often		once in a while		hardly ever		N.R.	
	#	%	#	%	#	%	#	%	#	%
Mosquitoes	30	39.0	18	23.4	20	26.0	9	11.7	0	0.0
Yellow flies	19	24.7	9	11.7	23	29.9	25	32.5	1	1.3
Biting gnats	19	24.7	20	26.0	14	18.2	24	31.2	0	0.0
Greenheads	5	6.5	9	11.7	24	31.2	32	41.6	7	9.1

The responses to these questions indicate a consistently lower level of annoyance due to biting insects than the mail replies. However in the mail replies, areas 10, 11, 13 and 15 were also lower than the average.

Question 3a: Are mosquitoes as "bad" now as they used to be (10-15 years ago)?

Mail Response: Most respondents (63.6%) who could make the comparison thought there had been an improvement with regard to mosquitoes over the last 10-15 years. 35.6% believed there had been no improvement (23.6% thought the situation was the same and 12.0% thought it had deteriorated.)

Interview Response: 72.9% of those who had lived in the area long enough thought the mosquito situation had improved over the years. The rest (27.1%) believed mosquitoes were the same now or worse.

Question 3b: Are other biting flies and gnats as "bad" now as they used to be (10-15 years ago)?

Mail Response: Only 37.0% thought there had been any improvement in biting flies other than mosquitoes (versus 64.4% for mosquitoes). Almost twice as many (63.0%) responded that there had been no improvement (45.4% the same and 17.6% thought it was worse now.)

Interview Response: The participants were almost equally divided as to whether there had been any improvement or not. 51.1% thought they were not as bad now and 48.9% thought there had been no improvement (36.7% the same and 12.2% worse now.)

The answers to these preceeding questions indicate that even though the residents of Carteret County believe that the mosquito problem has improved over the years they are still the most serious pest problem. The biting flies other than mosquitoes, on the other hand, are believed to be a major source of irritation which have remained unabated for the last 10-15 years.

Question 4: What time of day are you bothered by each of the following insects?

Mail Response: Since many of the people marked more than one time of the day the frequency of response to each time for each group of insects will be given.

Insect	before 10 AM		10 AM - 2 PM		2 PM - 6 PM		6 PM - Dark		after dark	
	#	%	#	%	#	%	#	%	#	%
Mosquitoes	383	18.6	167	8.1	240	11.7	740	25.8	531	25.8
Yellow flies	283	17.6	370	23.0	515	32.0	354	22.0	82	5.1
Biting gnats	269	18.5	150	10.3	226	15.6	468	32.2	340	23.4
Greenheads	175	15.1	328	28.2	381	32.8	227	19.5	51	4.4

This question was included to determine how much the respondents knew about the flight times of the various biting flies in the area. It was realized that the answers given would be influenced by the time of day the people were outside. With the exception of the people who checked every answer, the answers are in line with what is known about the times of flight. Mosquitoes and biting gnats are most active in the early morning, before dark and after dark. Yellow flies and greenheads are most active during the daylight hours, especially mid-day.

Interview Response: Not tabulated due to small numbers.

Question 5: Do biting insects interfere with any of the following activities in which you participate?

Mail Response:

Activity	Yes		No		Don't participate		N.R.	
	#	%*	#	%*	#	%	#	%
Yardwork	844	96.1	34	3.9	9	1.0	16	1.8
Golf	104	72.7	39	27.3	564	62.5	196	21.7
Fishing	540	88.4	71	11.6	173	19.2	119	13.2
Hunting	309	87.8	43	12.2	380	42.1	171	18.9
Swimming	439	76.5	135	23.5	172	19.0	157	17.4
Boating	473	79.2	124	20.8	168	18.6	138	15.3

*percentage of those who participate.

These answers indicate that biting insects are a problem regardless of the type of out door activity. It is interesting to note that most hunters are annoyed, even though hunting is a cool weather activity. This indicates biting fly activity well into the fall of the year.

Interview Response:

Activity	Yes		No		don't participate		N.R.	
	#	%*	#	%*	#	%	#	%
Yardwork	48	81.4	11	18.6	18	23.4	0	0.0
Golf	5	27.8	13	72.2	57	74.0	2	2.6
Fishing	30	66.7	15	33.3	31	40.3	1	1.3
Hunting	11	44.0	14	66.0	50	64.9	2	2.6
Swimming	33	53.2	29	46.8	15	19.5	0	0.0
Boating	16	37.2	27	62.8	31	40.3	3	3.9

*percentage of those who participate.

The percentages of those bothered while engaging in out door activities are consistently lower than those responding by mail.

Question 6: If you use repellent on yourself how satisfied are you with the protection it gives?

Mail Response: Most of the respondents use insect repellent (78.0%)

Slightly more than half of these people are satisfied (51.7%) the rest are not satisfied with the protection they receive.

Interview Response: More than half of the people who used repellent were satisfied with the protection provided (13.0% very satisfied and 50.0% satisfied). 37.0% were dissatisfied and 29.9% did not use repellents.

Question 7: Do you think there should be more community effort devoted to control of the biting insects in this area?

Mail Response: A large majority (84.2%) of the respondents felt that there was a need for more community effort. Only 1.6% wanted less effort, 6.3% thought control efforts were adequate and 7.8% had no opinion or did not respond.

Interview Response: Most of those interviewed (69.5%) felt more effort was needed, although a number, (16.9%) felt that present control efforts were adequate. 14.3% had no opinion and one individual did not respond. None thought less control was needed.

The lower interview response is understandable since the individuals that were contacted were bothered less by biting insects of all kinds (Question 1 and 2).

Question 8: How much would it be "worth" to you to have better control of biting insects in this area?

Mail Response: Only 10.6% of the people responding said it was worth nothing to them for better biting fly control. In addition 7.8% refused to answer. 81.4% stated that they would be willing to pay some amount of money. The amount and percentages are as follows: \$5-\$10/yr., 45.2%; \$2-\$5/yr., 28.3%; \$1/yr., 8.1%.

Interview Response: The responses to this question were similar to those of the mail survey (\$5-\$10, 41.6%; \$2-\$5, 26.0%; \$1, 3.9%; nothing, 20.8%; no response, 7.8%).

Question 9: If you are a property owner do you think your property would increase in value if there were fewer biting insects?

Mail Response: The total number of property owners was 769. Of these 55.8% believed their property would increase in value if there were fewer biting insects. Only 25.1% believed there would be no increase in value and 19.1% were undecided.

Interview Response: Half of the property owners (49.0%) thought the value of their property would increase if there were fewer biting flies. 34.7% felt it would not increase and 16.3% had no opinion.

Question 10: If you are a visitor to this area, would you come more often if there were fewer biting insects?

Mail Response: Unfortunately, only 11 visitors responded. Nine said they would come more often if there were fewer biting insects and 2 said they would not come any more often. This number of responses is much too small to give a reliable estimate of the opinions of the thousands of visitors that travel in the county each year.

Interview Response: A total of 21 visitors were contacted and interviewed. Only 4 said they would come more often, while 11 said they would not come more often if there were fewer biting insects. 6 were undecided. This is just the opposite from the responses of visitors in the mail survey. Both samples are too small to judge the opinion of the many visitors to the county.

Question 11: To what extent do you think each of the following is a problem?

Mail Response:

Problem	<u>serious</u>		<u>moderate</u>		<u>slight</u>		<u>none</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
Biting Flies	501	55.5	309	34.2	65	7.2	6	0.7	22	2.4
Waste Disposal	334	37.0	258	28.6	136	15.1	73	8.1	102	11.3
Water Supply	84	9.3	175	19.4	188	20.8	309	34.2	147	16.0
Air Pollution	95	10.5	201	22.3	319	35.3	158	17.5	130	14.4
Area										
Beautification	251	27.8	297	32.9	171	18.9	68	7.5	117	13.0
Water Pollut.	351	38.9	232	25.7	142	15.7	67	7.4	111	12.3
Housing	135	14.9	258	28.6	204	22.6	144	15.9	162	17.9
Protection of the Environ.	337	37.3	233	25.8	139	15.4	64	7.1	130	14.4

In the opinion of the people surveyed in Carteret County, biting flies are the most serious of the problems mentioned. Water pollution was seen as the next most serious problem (38.9%) followed by protection of the environment (37.3%) and waste disposal (37.0%).

A cross check was made between the biting fly part of this question and Question #1 as a check on the consistency of the respondents. Of the 714 people who said they were bothered often by biting flies, 65.7% considered biting flies a serious problem. The response of those who were

only sometimes bothered in Question #1 was quite different. Only 14.5% considered biting flies a serious problem.

Interview Response:

Problem	<u>serious*</u>		<u>moderate*</u>		<u>slight*</u>		<u>none*</u>	
	#	%	#	%	#	%	#	%
Biting Flies	16	27.1	24	40.7	18	30.5	1	1.7
Waste Disposal	11	20.0	15	27.3	11	20.0	18	32.7
Water Supply	3	5.3	3	5.3	12	21.0	39	68.4
Air Pollution	3	5.1	7	11.9	16	27.1	33	55.9
Area								
Beautification	8	13.6	23	39.0	10	16.9	18	30.5
Water Pollution	21	36.8	9	15.8	8	14.0	19	33.3
Housing	7	11.9	15	25.4	12	20.3	25	42.4
Protection of the Environ.	22	37.9	13	22.4	7	12.1	16	27.6

*percentages based on number responding.

These responses tend to confirm the previous finding that the people who were interviewed in person were not as annoyed by biting flies as those responding by mail. Indeed, all problem areas, except water pollution and protection of the environment, were considered less serious by this group.

This question was an attempt to find out how serious the biting fly problem is in relation to other ecological and "quality of life" problems in the area. However, the responses to the question for both the mail and interview survey must be considered very critically. The sudden shift from biting flies to other problems may well have biased the responses in favor of biting flies and against the other problems. In addition, the point of reference of the respondent must be taken into account. All of the people who conducted the interviews felt that the respondents were answering this question with only their immediate neighborhood in mind rather than the county as a whole. Thus, if they did not see pollution every day or if they had adequate housing and water supply, these things were not serious problems.

Question 12: Which of the following are you?

Mail Response: Live and work in this county (a resident), 854 or 94.6%

Have property in this county and spend a few days here nearly every month, 38 or 4.2%.

A visitor; don't own property here, 8 or 0.9%.

No response, 3 or 0.3%.

Interview Response: Live and work in this county (a resident), 50 or 64.9%.

Have property in this county and spend a few days nearly every month, 6 or 7.8%.

A visitor; don't own property here, 20 or 26.0%.

No response, 1 or 1.3%.

Question 13: Your sex?

Mail Response: Male 571 for 63.2%

Female 318 for 35.2%

No response 14 for 1.6%

Interview Response: Male 35 for 45.4%.

Female 41 for 53.2%

No response 1 for 1.3%

The sex ratio is considerably different from the mail survey.

Question 14: Your age?

Mail Response: 18 - 25, 94 for 10.4%

25 - 40, 250 for 27.7%

Over 40, 540 for 59.8%

No response, 19 for 2.1%

There was very little difference in the answers to Question 1 on the frequency of irritation when the sex and age groups were taken separately.

Interview Response: 18 - 25, 9 for 11.7%

25 - 40, 37 for 48.0%

Over 40, 27 for 35.1%

No response, 4 for 5.2%

This again is different from the mail survey. Most of those responding by mail were over 40 rather than 25 - 40.

Question 2 and 4 had an "other" category in addition to the insects listed. Many of the respondents mentioned arthropods other than biting flies that bothered them. These are of some importance, since they were unsolicited responses concerning annoying pests. As a group, ants were mentioned the greatest number of times. "Fire ants" 40 times, "ants" 33 times and "red ants" 10 times. "Ticks" were mentioned 34 times and "chiggers" or "red bugs" 26 times. Other insects of interest were "wasps" and "yellow jackets" 26 times and "house flies" 7 times. Other miscellaneous pests were mentioned a total of 59 times.

SURVEY RESULTS FOR PAMLICO COUNTY

SUMMARY

In August 1972 a public opinion survey was made in Pamlico County, North Carolina to ascertain how people in that county view the problems associated with coastal biting flies. A total of 527 mail surveys were sent to farmers only throughout the county. 160 were returned for a 30.4% return rate.

From the analysis of these returns, the following general conclusions can be made:

- (1) Most respondents (71.3%) were bothered often by biting insects of various kinds.
- (2) Mosquitoes and yellow flies annoyed the respondents the most. Biting gnats and greenheads were less annoying.
- (3) Even though many of the respondents were bothered often by biting insects, most felt that the situation had improved over the last 10-15 years.
- (4) Most respondents thought that more community effort was needed for control of biting insects and expressed a willingness to pay for that effort.
- (5) Most property owners felt their property would increase in value if there were fewer biting insects.
- (6) Some areas of the county appear to have a much more serious problem with biting flies than others.

INTRODUCTION

Pamlico County, North Carolina, has over 21,000 acres of salt marshes, fifth largest of all the coastal counties. This survey was conducted to determine what opinions certain segments of the population held concerning the biting flies produced from these salt marshes.

Extent of the Survey:

Questionnaires were mailed to all parts of the county. For the purposes of the survey, the county was divided into the following five areas (Fig. 3):

- (1) Goose Creek
- (2) Vandemere
- (3) Bayboro
- (4) Oriental
- (5) Arapahoe

Conduct of the Survey:

The questionnaires were identical to those used in Carteret County. Questionnaires were addressed and mailed by the county extension agent for Pamlico County to all farm owners and tenants farming over three acres of land. The following was included on an official extension service post card:

Bayboro, N.C. 28515

Dear Folks:

We will appreciate your reading and studying the enclosed questionnaire and answer each question. Please return as soon as possible.

We feel this program will be most beneficial to Pamlico County. This survey is being conducted jointly with the Pamlico County Health Dept., and County Extension Office.

Sincerely,

J. L. Rea, Jr.
County Extension Agent

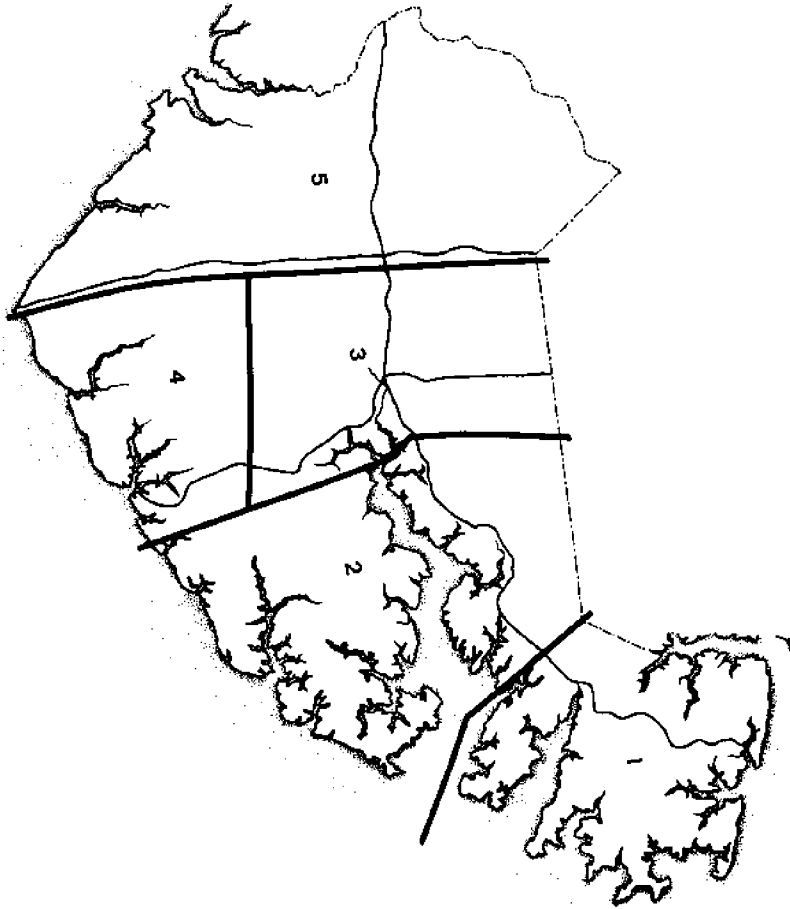


Fig. 3 Map of Pamlico County

RESULTS

A total of 527 surveys were mailed to the farm residents of Pamlico County. Of these 160 were returned from all areas for a 30.4% return rate. Table I of Appendix III gives the numbers distributed and returned from each area. Only the totals for the county as a whole are given in this section. There were significant differences among the areas in the responses to some questions indicating that certain areas of the county have a greater problem than others. For a detailed breakdown of the response for each area, see Tables 2 through 30 of Appendix III.

The results of this survey should not be considered equivalent to those of the other counties. Surveys were sent to persons who resided on and/or owned 3 acres or more of farmland. In the other counties, the questionnaires were distributed to residents of selected areas without regard to land ownership or occupation. In addition, it is not possible to compare relative effectiveness of the mosquito control efforts of these counties based on these results.

Question 1: How often are you bothered by biting insects out-of-doors?

Most of the respondents stated they were bothered often (71.3%).

However, there was considerable variation in the responses from different areas of the county. In the Bayboro area, only 46.7% were bothered often while 93.7% in Vandemere were in this category. Those who were sometimes bothered amounted to 23.1% and seldom bothered 1.9%. None of the respondents were never bothered and 6 did not respond.

Question 2: How often do each of the following insects bother you out-of-doors?

Insect	very often		quite often		once in a while		hardly ever		N.R.	
	#	%	#	%	#	%	#	%	#	%
Mosquitoes	66	41.3	55	34.4	32	22.5	3	1.9	0	0.0
Yellow flies	52	32.5	59	36.9	43	26.9	2	1.3	4	2.5
Biting gnats	26	16.3	28	23.8	58	36.3	8	11.3	20	12.5
Greenheads	21	13.1	31	19.4	60	37.5	24	15.0	24	15.0

The percentage of those bothered very often by mosquitoes is misleading because the Bayboro and Arapahoe areas were much lower than the average of 41.3%. The other three areas seem to have a much greater problem.

Question 3a: Are mosquitoes as "bad" now as they used to be (10-15 years ago)?

A large majority (80.3%) of those who could make the comparison thought mosquitoes were not as bad now. 15.8% thought they were the same and only 3.9% thought they were worse.

Question 3b: Are other biting flies and gnats as "bad" now as they used to be (10-15 years ago)?

Only 43.3% thought the situation had improved over the years. Of the rest, 40.5% thought it was the same and 16.7% thought it was worse now. Here again, as in Carteret County, the people indicated improvement with regards to mosquitoes, but felt that other biting flies had not improved as much.

Question 4: What time of day are you bothered by the following insects?

Insect	before 10 A.M.		10 A.M. - 2 P.M.		2 P.M. - 6 P.M.		6 P.M. - dark		after dark	
	#	%	#	%	#	%	#	%	#	%
Mosquitoes	65	23.6	13	4.7	34	12.4	99	36.0	64	23.3
Yellow flies	60	20.8	53	18.3	92	31.8	66	22.8	18	6.2
Biting gnats	47	27.3	14	8.1	33	19.2	60	34.9	18	10.5
Greenheads	36	17.0	52	24.5	66	31.1	43	20.3	15	7.1

Some of the respondents marked every time of the day but in general these answers correspond to what is known about the daily activity period of these insects. Yellow flies and greenheads are most active during the daylight hours while mosquitoes and biting gnats are most active in the early morning, just before dark and after dark.

Question 5: Do biting insects interfere with any of the following activities in which you participate?

Activity	<u>Yes</u>		<u>No</u>		<u>do not participate</u>		<u>N.R.</u>	
	#	%*	#	%*	#	%	#	%
Yardwork	142	93.4	10	6.6	1	0.6	7	4.4
Golf	20	71.4	8	28.6	66	41.3	66	41.3
Fishing	82	89.1	10	10.9	27	16.9	41	25.6
Hunting	72	92.3	6	7.7	32	20.0	50	31.3
Swimming	41	65.1	22	34.9	35	21.9	62	38.8
Boating	53	63.9	20	24.0	34	21.3	53	33.1

*Percentage of those who participate.

These responses show that biting insects interfere with the outdoor activities of a majority of the people in spite of the relatively low responses to question 2.

Question 6: If you use an insect repellent on yourself, how satisfied are you with the protection it gives?

Most of the respondents use insect repellents (66.0%). A little more than half of these people are satisfied (59.8%), the rest are not satisfied with the protection they receive.

Question 7: Do you think there should be more community effort devoted to the control of biting insects in this area?

Despite the fact that less than half of the people were bothered very often by any of the biting insects mentioned in question 2, 72.5% of the respondents thought there should be more community effort devoted to control. Only 1.3% wanted less effort and 16.2% either had no opinion or did not respond.

Question 8: How much would it be "worth" to you to have better control of biting insects in this area?

Two out of three respondents said they would be willing to pay for better control of biting insects (\$5-10/year, 35.6%; \$2-5/year, 23.8%; \$1/year, 6.9%). Of the rest, 18.8% were not willing to pay any amount and 15.0% did not respond.

Question 9: If you are a property owner, do you think your property would increase in value if there were fewer biting insects?

Of the 152 property owners, 55.3% thought their property would increase in value, 26.3% did not think it would and 18.4% were undecided.

Question 10: If you are a visitor to this area, would you come more often if there were fewer biting insects?

There was only one visitor in this sample and he said he would come more often if there were fewer biting flies.

Question 11: To what extent do you think each of the following is a problem in this area?

Problem	<u>serious</u>		<u>moderate</u>		<u>slight</u>		<u>none</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
Biting flies	71	44.4	64	40.0	16	10.0	1	0.6	8	5.0
Waste Disposal	48	30.0	42	26.3	26	16.3	11	6.9	33	20.6
Water Supply	20	12.5	40	25.0	29	18.1	31	19.4	40	25.0
Air Pollution	15	9.4	33	20.6	47	29.4	22	13.8	43	26.9
Area										
Beautification	31	19.4	48	30.0	30	18.8	14	8.8	34	23.1
Water Pollution	31	19.4	42	26.3	34	21.3	12	7.5	41	25.0
Housing	11	6.9	42	26.3	37	23.1	23	14.4	47	29.4
Protection of the Environment	22	13.8	47	29.4	31	19.4	12	7.5	48	30.0

Biting flies are thought to be the most serious problem, followed by waste disposal. The other problems are not considered nearly as serious.

Question 12: Which of the following are you?

Live and work in this county (a resident)?

155 for 96.9%

Have property in this county and spend a few days here nearly every month?

2 for 1.3%

A visitor? 1 for 0.6%

No response. 2 for 1.3%

Question 13: Your sex?

Male - 76.9%
Female - 21.3%
No response - 1.9%

Question 14: Your age?

18 - 25 - 0.6%
25 - 40 - 12.5%
Over 40 - 83.1%
No response - 3.8%

SURVEY RESULTS FOR PENDER COUNTY

SUMMARY

A total of 428 questionnaires were distributed to residents and visitors in the coastal part of Pender County. Of these, 113 were filled out and returned for a 26.4% return rate. The following general conclusions can be made from the tabulations of the results:

- (1) A very large majority of 86.7% of the respondents were bothered often by biting insects.
- (2) Mosquitoes and biting gnats are the most common cause of their annoyance.
- (3) Biting gnats are a greater problem than mosquitoes in two out of three areas.
- (4) Most of the respondents do not feel that the biting fly situation has improved over the last 10-15 years.
- (5) More than four out of five wanted more community effort devoted to insect control. Three out of four were willing to pay some amount of money for that control.
- (6) Most property owners felt that their property would increase in value if there was better control.

INTRODUCTION

Pender County, North Carolina is bordered on the southeast by the Atlantic Ocean. The beach front is only about 15 miles long, extending from Rich Inlet to about two miles northeast of Surf City. The county also has over 9,000 acres of salt marsh. The beach front and the salt marshes are also the areas of the bulk of the recreational activity in the county.

Extent of the survey:

This survey was confined to the coastal part of the county, which, in all likelihood, is most affected by coastal biting flies. This part of the county was divided into three areas (Fig. 4) for the purpose of this survey. They were:

- (1) Hampstead
- (2) Topsail Beach
- (3) Surf City

Conduct of the survey:

Unaddressed questionnaires were delivered to box holders in each area by the local post office. The questionnaires were identical to those used in Carteret and Pamlico Counties (Appendix I). Geographical position of the residence was the only criteria for the distribution of the survey.

RESULTS

A total of 428 questionnaires were delivered in Pender County. 113 were completed and mailed back by the respondents for a 26.4% return. Table 1, Appendix IV gives the breakdown of the numbers distributed and returned from each area. Tables 2 through 30, Appendix IV show the response to each question for each area. In this section only the total response for the county will be given, unless there are major differences in the responses among the areas.

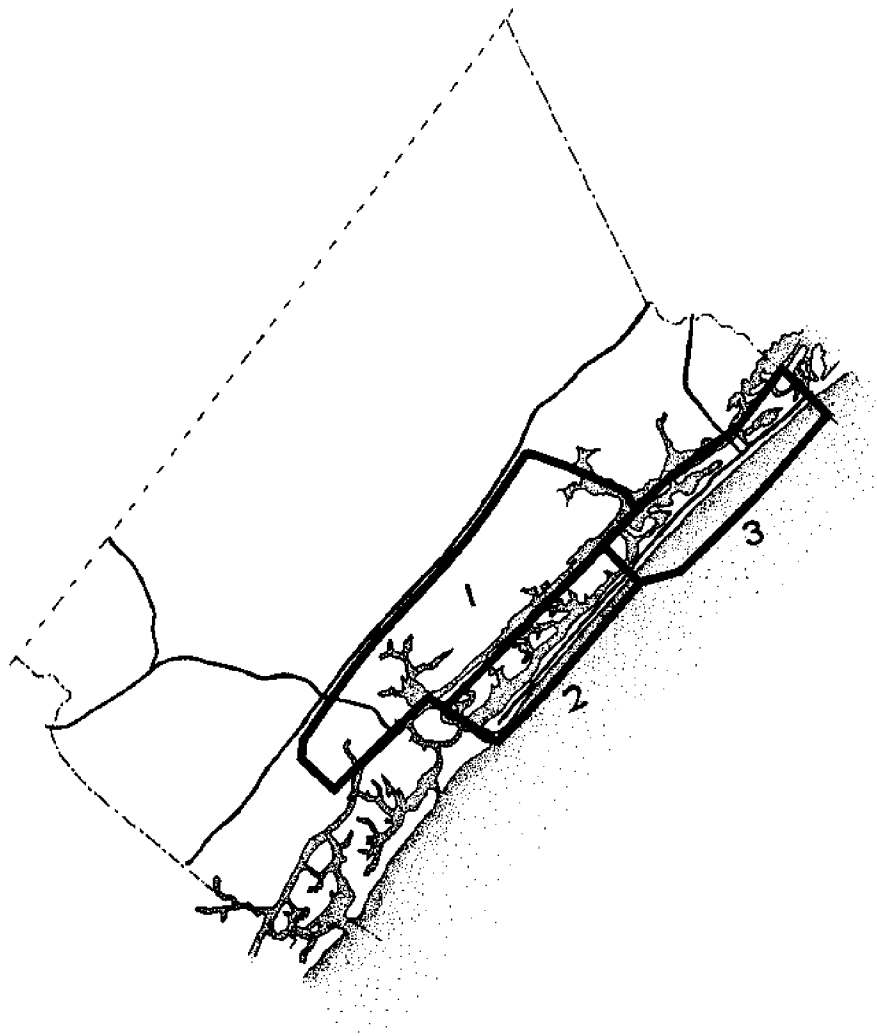


Fig. 4 Map of coastal Pender County

Question 1: How often are you bothered by biting insects out-of-doors?

A large majority (86.7%) of the respondents were bothered often; 10.6% were bothered sometimes and only one individual was seldom bothered. None of the respondents were never bothered and two did not respond.

Question 2: How often do each of the following insects bother you out-of-doors?

Insect	very often		quite often		once in a while		hardly ever		N.R.	
	#	%	#	%	#	%	#	%	#	%
Mosquitoes	64	56.6	29	25.7	14	12.4	5	4.4	1	0.9
Yellow flies	23	20.4	24	21.2	33	29.2	21	18.6	12	10.6
Biting gnats	59	52.2	32	28.3	17	15.0	4	3.5	1	0.9
Greenheads	12	10.6	17	15.0	31	27.4	33	29.2	20	17.7

Mosquitoes and especially biting gnats are rated very high by the respondents. From Table 3 it can be seen that the respondents from the Surf City area are much more concerned about mosquitoes than the other areas. The responses concerning biting gnats are especially interesting (Table 5). Both Hampstead and Topsail Beach rated them higher than mosquitoes as a cause of annoyance. This is the only instance of this occurrence in the entire survey.

Question 3a: Are mosquitoes as "bad" now as they used to be (10-15 years ago)?

A little less than half (45.6%) of the respondents who could make the comparison, felt that there had been any improvement. The rest were about equally divided between no change (29.4%) and deterioration (25.0%).

Question 3b: Are other biting flies and gnats as "bad" now as they used to be (10-15 years ago)?

Only 20.0% of the respondents thought there had been any improvement. Most (52.3%) felt that things were the same now and 27.7% thought them to be worse now.

Question 4: What time of day are you bothered by each of the following insects?

Many of the respondents marked more than one time of day, therefore the frequency of response for each group of insects is given.

Insect	before 10 A.M.		10 A.M. - 2 P.M.		2 P.M. - 6 P.M.		6 P.M. - after dark		after dark	
	#	%	#	%	#	%	#	%	#	%
Mosquitoes	49	18.4	23	8.6	38	14.2	79	29.6	78	29.2
Yellow flies	29	16.8	42	24.3	58	34.1	32	18.5	11	6.4
Biting gnats	61	22.8	36	13.4	54	20.1	66	24.6	51	19.0
Greenheads	17	13.5	33	26.2	42	33.3	21	16.7	13	10.3

These responses are of course influenced by the time of day that the respondents are active out-of-doors. With the exception of the people who marked all answers, this corresponds closely to what is known about the activity of these groups.

Question 5: Do biting insects interfere with any of the following activities in which you participate?

Activity	Yes		No		don't participate		N.R.	
	#	%*	#	%*	#	%	#	%
Yardwork	109	99.1	1	0.9	2	1.8	1	0.9
Golf	9	64.3	5	35.7	68	60.2	31	27.4
Fishing	92	96.8	3	3.2	11	9.7	7	6.2
Hunting	45	95.7	2	4.3	46	40.7	20	17.7
Swimming	66	83.5	13	16.5	17	15.0	17	15.0
Boating	74	93.7	5	6.3	19	16.8	15	13.3

*Percentages based on those who participate.

Most of the respondents said they were interfered with by biting insects in all types of activity listed.

Question 6: If you use an insect repellent on yourself, how satisfied are you with the protection it gives?

Two out of three of the people who used repellent were not satisfied. One-third were either satisfied or very satisfied.

Question 7: Do you think there should be more community effort devoted to the control of biting insects in this area?

The response to this question is quite definite. 86.7% wanted more effort; only 4.4% thought the effort was adequate. One person wanted less effort and four did not respond.

Question 8: How much would it be "worth" to you to have better control of biting insects in this area?

Here again there is a strong response. 78.7% of the respondents said it would be worth some amount of money for better control (\$5-10/yr. 51.3%; \$2-5/year, 18.6%; \$1/year, 8.0%). Only 7.1% said it would be worth nothing and 14.2% did not respond.

Question 9: If you are a property owner, do you think your property would increase in value if there were fewer biting insects?

Of the 88 property owners, 68.2% answered this question yes. Only 19.3% did not think their property would increase in value and 12.5% were undecided.

Question 10: If you are a visitor to this area, would you come back more often if there were fewer biting insects?

The number of visitors responding was only two, much too small to be reliable.

Question 11: To what extent do you think each of the following is a problem in this area?

Activity	<u>serious</u>		<u>moderate</u>		<u>slight</u>		<u>none</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
Biting insects	73	64.6	31	27.4	6	5.3	0	0.0	3	2.7
Waste Disposal	37	32.7	28	24.8	15	13.3	13	11.5	20	17.7
Water Supply	12	10.6	17	15.0	18	15.9	44	38.9	22	19.5
Air Pollution	4	3.5	12	10.6	35	31.0	40	35.4	22	19.5
Area										
Beautification	32	28.3	27	23.9	17	15.0	23	20.4	14	12.4
Water Pollution	22	19.5	40	35.4	21	18.6	21	18.6	19	16.8
Housing	9	8.0	13	11.5	25	22.1	41	36.3	25	22.1
Protection of the Environment	34	30.0	31	27.4	14	12.4	16	14.2	18	15.9

Twice as many people thought biting flies are more of a problem than any of the other categories. Waste disposal, protection of the environment and area beautification, in order, are the next most serious problems.

Question 12: Which of the following are you?

Live and work in this county (a resident), 84.1%.

Have property in this county and spend a few days here nearly every month, 12.4%.

A visitor, don't own property here, 1.8%.

No response, 1.8%.

Question 13: Your sex?

67.3% of the respondents were male and 31.0% were female. 1.8% did not respond.

Question 14: Your age?

18 - 25 8.0%

25 - 40 31.9%

Over 40 58.4%

No Response 1.8%

DISCUSSION

This public opinion survey was an attempt to find out if the people of coastal North Carolina consider biting flies an economically important problem. In addition, we wanted to know what insects they considered to be pests and which areas were most effected. These are some of the factors which must be known for a pest management program to be effective.

The economic importance of blood sucking flies that attack man, except where disease transmission is involved, is the collective and subjective opinions of the people who are annoyed by them. There is a level of insect abundance above which it is economically justified to institute control measures. This "economic threshold" for biting insects is very difficult to measure scientifically. In practical terms, it is determined by the willingness of the people to tax themselves for government conducted abatement activities. This threshold will vary from place to place and the same people may have different threshold levels from year to year. The questions in this survey about the need for "community effort" and "worth" of better insect control reflect this threshold level.

A management program incorporates the minimum of control efforts consistent with the objectives. Only those species which are truly pests should be attacked and then only when and where they are above the economic threshold level. The answers to question 2 give the relative importance of the different kinds of insects in the area. In addition, a comparison of the responses from the localized areas within the counties give some clues as to where these insects are most abundant.

This questionnaire survey information cannot be used for management decisions without confirmation by actual field surveys of the insect populations and their breeding sites. It does, however, delineate the localities where insect surveys are needed and reveals which insect pests are most bothersome to the people. This is an important early step in planning a management program.

As a result of conducting this survey and analysing the results, some of the deficiencies and shortcomings of the survey and the questionnaire become apparent. Here are some suggested changes that might be incorporated into any future surveys.

- (1) The survey should be made only by mail. Personal interviews require a large expenditure of manpower for very small returns.
- (2) Distinct localized areas should be chosen so comparisons can be made among them.
- (3) Geographical locations should be the only criteria for a person to be selected to participate in the survey.
- (4) Questions 4 and 6 should be eliminated as they are of limited value in this type of survey.
- (5) Question 8 should provide greater range expressed in terms of tax assessments.
- (6) Question 10 should be dropped unless a special effort is made to distribute large numbers of the questionnaires to visitors.
- (7) A question about the time of year that each of the insects are annoying would be a useful addition.
- (8) It is important to provide a comparative framework in relation to other social problems. Question 11 was an attempt at this, but it proved to be more confusing than helpful. It would be better if the participants were asked to rate all the problems on a numerical scale.

It is recognized that, even with these suggested improvements, that this survey questionnaire does not conform to the types of surveys often considered appropriate in sociological research. We deliberately chose not to include such questions as income, education, race, religion, etc.. We were not interested in the profiles of the respondents and felt that personal questions would interfere with our primary goals and reduce the number of responses. Likewise we did not attempt to have a random sampling procedure. Rather, we wished to saturate discrete geographical areas where insect problems were known to us or could be subsequently investigated further. Our approach was well received by the people

which is an important consideration if future pest management activities are anticipated.

The coastal region of North Carolina is experiencing and will continue to experience economic growth and land development. Land use planning is underway to provide for orderly progress in development and at the same time minimize environmental degradation. At the present time, the decision on how land is to be used is based on many factors including economics, recreation needs, conservation, sewage disposal and many others. The insect pest problem should be taken into account to some degree. If an area to be developed for housing has a very serious biting fly and mosquito problem, the people who will live there will want abatement of the offending pests. Control of these insects will have at least two adverse consequences; (1) there will have to be an expenditure of public money for abatement, and (2) there will be some degradation of the surrounding environment, depending upon the types of control methods used. Thus, biting insect control constitutes a hidden cost, both monetary and ecological, of development in areas with serious insect pest problems.

If biting flies and mosquitoes are to be taken into account in zoning and land use policies, then the agencies making these decisions must know where biting insects are a problem and where they are not. At the present time, this information does not exist for most of the state. A program to obtain even preliminary information by conventional means would require a huge expenditure of manpower and public funds. A public opinion survey of the type described in this report would provide useful information at a relatively low cost. Questionnaires could be mailed to communities along the entire length of the coast and preliminary maps showing the levels of annoyance by insects pests made. Subsequently the accuracy of these maps should be refined by insect surveys in the field in the critical localities.

The maps of the biting insect problem areas would also be of use in formulating state-wide control efforts. As development continues there is going to be increased demand for better management of biting insects. Research is in progress to collect the information needed for

a pest management system which will reduce the impact on the salt marshes of efforts to control biting flies and mosquitoes. When this system is developed it will not be a single, simple remedy, but a combination of several methods including water management and the use of biological and chemical control agents. In addition, it will not be possible to apply these methods in the same manner in all portions of the coastal region. The system will have to be modified to suit local variations in the salt marshes themselves, and variations in the pest species and populations.

APPENDIX I SAMPLE SURVEY

AGRICULTURAL EXTENSION SERVICE

INSECT NOTES



Survey of Opinions on Biting Insect Control

The Department of Entomology of North Carolina State University is conducting research on the biology and control of biting insects which attack man and animals in the coastal areas.

We need the advice of people (residents and visitors) to determine what type of information will benefit the most people. Your answer to the following questions will help us to serve the needs of the area more effectively.


Thank you for your time and willingness to help. If you would like a copy of the results of this survey please write your name and address (with zip code) at the end of the questionnaire. Otherwise there is no need to sign your name.


John M. Falter
John M. Falter
Extension Entomologist

Richard C. Axtell
Richard C. Axtell
Research Entomologist


Department of Entomology
North Carolina State Univ.
Raleigh, N. C. 27607


KINDS OF BITING INSECTS

mosquitoes: about this long: , have long legs, narrow body, make a hum-like noise when near you.

yellow flies: (= deer flies): a little bigger than a house fly, about this long:  have a mixture of yellow brown color on the body and wings, often fly around a persons head. Some kinds may be very dark color.

biting gnats: (= sand gnats): very tiny, about this long - and very hard to see. They make a tiny red spot where they bite.

greenheads: (= horseflies): at least twice as big as a house fly, about this long  and have a large head with green color on it.

dog fly: (= biting house fly): the size of a house fly  and look very much like a house fly but they bite.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS NORTH CAROLINA STATE UNIVERSITY AT RALEIGH, 100 COUNTIES AND U. S. DEPARTMENT OF AGRICULTURE COOPERATING



Please tell us how you feel about the biting insects in this AREA (COUNTY), not somewhere else. Check appropriate box.

1. How often are you bothered by biting insects out-of-doors?

- ☐ often ☐ seldom
☐ sometimes ☐ never

2. How often do each of the following insects bother you out-of-doors?

	very often	quite often	once in a while	hardly ever
mosquitoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
yellow flies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
biting gnats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
greenheads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
dog fly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
other _____ name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3a. Are mosquitoes as "bad" now as they used to be (10-15 years ago)?

- ☐ not as bad ☐ worse now
☐ same ☐ don't know

b. Are other biting flies and gnats as "bad" now as they used to be (10-15 years ago)?

- ☐ not as bad ☐ worse now
☐ same ☐ don't know

4. What time of day are you bothered by each of the following insects?

	before 10 AM	10 AM- 2 PM	2 PM- 6 PM	6 PM- dark	after dark
mosquitoes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
yellow flies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
sand gnats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
greenheads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
dog fly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Do biting insects interfere with any of the following activities in which you participate?

	yes	no	don't participate
yardwork	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
golf	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
swimming	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
boating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. If you use an insect repellent on yourself, how satisfied are you with the protection it gives?

- ☐ very satisfied ☐ not satisfied
☐ satisfied ☐ don't use

7. Do you think there should be more community effort devoted to the control of biting insects in this area?

- ☐ need more ☐ adequate now
☐ need less ☐ no opinion

8. How much would it be "worth" to you to have better control of biting insects in this area?

- ☐ \$5 - \$10 per year ☐ \$1 per year
☐ \$2 - \$5 per year ☐ nothing

9. If you are a property owner, do you think your property would increase in value if there were fewer biting insects?

- ☐ yes ☐ undecided
☐ no ☐ not a property owner

10. If you are a visitor to this area, would you come more often if there were fewer biting insects?

- ☐ yes ☐ undecided
☐ no ☐ not a visitor

11. To what extent do you think each of the following is a problem in this area?

	serious	moderate	slight	none
biting insects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
waste disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
water supply	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
area beautification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
water pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
housing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
protection of environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. Which of the following are you?

- ☐ live and work in this county (a resident)
- ☐ have property in this county and spend a few days here nearly every month
- ☐ a visitor; don't own property here, I visit _____ times a year.
how many?

13. Your sex?

- ☐ male
- ☐ female

14. Your age?

- ☐ 18-25
- ☐ 25-40
- ☐ over 40

15. Any remarks?

16. I would like to receive a copy of the results of this survey and be on the mailing list for future information on biting insects (Please Print).

Name _____

Address _____

Zip Code _____

PLEASE MAIL IN ENVELOPE PROVIDED. NO STAMP IS NEEDED

Research on insect pest management in coastal and estuarine areas is part of the N. C. Sea Grant Program, supported in part by Grant No. GH-103, NOAA, U. S. Dept. of Commerce.

APPENDIX II CARTERET COUNTY

Table 1. Responses to the mail survey by area.

Area	Distributed	Returned	% Return
1. Atlantic	322	112	34.8
2. Stacy	100	29	29.0
3. Davis	100	36	36.0
4. Williston	81	38	46.9
5. Symrna	180	58	31.0
6. Harkers Island	237	65	28.4
7. Yucca Village	160	43	26.9
8. U. S. 70	79	24	30.4
9. N. Newport River	280	91	32.5
10. Newport	200	68	34.0
11. Country Club Rd.	200	72	36.0
12. Crab Point	100	39	39.0
13. Mitchell Village	215	69	32.1
14. Cape Carterett	183	80	42.3
15. Bogue Banks	251	79	31.5
Total	2688	903	33.6

Table 2. Question 1: How often are you bothered by biting insects out-of-doors?

	Often		Some-times		Seldom		Never		N.R.	
	#	%	#	%	#	%	#	%	#	%
1. Atlantic	102	91.1	7	6.3	1	0.9	0	0.0	2	1.8
2. Stacy	27	92.9	1	3.4	1	3.4	0	0.0	0	0.0
3. Davis	27	75.5	8	22.2	0	0.0	0	0.0	1	2.8
4. Williston	34	89.5	4	10.5	0	0.0	0	0.0	0	0.0
5. Symrna	51	87.9	7	12.1	0	0.0	0	0.0	0	0.0
6. Harkers Island	45	69.2	18	27.7	0	0.0	0	0.0	2	3.1
7. Yucca Village	33	76.7	8	18.6	1	2.3	0	0.0	1	2.3
8. U. S. 70	19	79.2	4	16.7	0	0.0	0	0.0	1	4.2
9. N. Newport River	80	87.9	8	8.8	0	0.0	0	0.0	3	3.3
10. Newport	49	72.1	15	22.1	3	4.4	0	0.0	1	1.5
11. Country Club Rd.	53	73.6	14	19.4	3	4.2	0	0.0	2	2.8
12. Crab Point	31	79.5	7	17.9	1	2.6	0	0.0	0	0.0
13. Mitchell Village	39	56.5	22	31.9	5	7.2	1	1.5	2	2.9
14. Cape Carterett	69	86.2	8	10.0	2	2.5	0	0.0	1	1.3
15. Bogue Banks	54	68.3	21	26.6	3	3.8	0	0.0	1	1.3
Total/Average	713	79.1	152	16.8	20	2.0	1	0.1	17	2.0

Table 3. Question 2: How often do each of the following insects bother you out-of-doors?

Mosquitoes		Very Often		Quite Often		Once in a while		Hardly Ever		N.R.	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	79	70.5	30	26.8	3	2.7	0	0.0	0	0.0
2.	Stacy	20	69.0	8	27.6	1	3.4	0	0.0	0	0.0
3.	Davis	24	66.7	7	19.4	5	13.9	0	0.0	0	0.0
4.	Williston	20	52.6	15	39.5	3	7.9	0	0.0	0	0.0
5.	Symrna	36	62.1	16	27.6	4	6.9	0	0.0	2	3.4
6.	Harkers Island	34	52.3	21	32.3	9	13.8	0	0.0	1	1.5
7.	Yucca Village	24	55.8	13	30.2	4	9.3	0	0.0	2	4.6
8.	U. S. 70	14	58.3	9	37.5	1	4.2	0	0.0	0	0.0
9.	N. Newport River	56	61.5	25	27.5	10	11.0	0	0.0	0	0.0
10.	Newport	34	50.0	19	27.9	14	20.6	1	1.5	0	0.0
11.	Country Club Rd.	33	45.8	22	32.3	13	30.5	2	2.8	2	2.8
12.	Crab Point	21	53.8	12	30.8	6	15.4	0	0.0	0	0.0
13.	Mitchell Village	31	44.9	16	23.2	17	24.6	4	5.8	1	1.5
14.	Cape Carterett	55	68.8	16	20.0	8	11.3	1	1.3	0	0.0
15.	Bogue Banks	43	54.4	20	25.3	15	20.0	1	1.3	0	0.0
Total/Average		524	58.0	249	27.6	113	12.6	9	2.0	8	1.0

Table 4. Question 2: How often do each of the following insects bother you out-of-doors?

Yellow flies		Very Often		Quite Often		Seldom		Hardly Ever		N.R.	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	26	23.2	49	43.8	36	32.1	1	0.9	0	0.0
2.	Stacy	18	62.1	8	27.6	3	10.3	0	0.0	0	0.0
3.	Davis	13	36.1	13	36.1	9	25.0	0	0.0	1	2.8
4.	Williston	22	57.9	12	31.6	1	2.6	0	0.0	3	7.9
5.	Symrna	12	20.7	27	46.5	16	27.6	0	0.0	3	5.2
6.	Harkers Island	15	23.1	18	27.9	29	44.6	2	3.1	1	1.5
7.	Yucca Village	22	51.2	8	18.6	10	23.3	1	2.3	2	4.6
8.	U. S. 70	11	45.8	7	29.2	1	4.2	1	4.2	4	16.7
9.	N. Newport River	51	56.0	21	23.1	12	13.2	3	3.3	4	4.4
10.	Newport	18	26.5	23	33.8	21	30.9	5	7.3	1	1.5
11.	Country Club Rd.	10	13.9	18	25.0	27	37.5	10	13.9	7	9.7
12.	Crab Point	5	12.8	8	20.5	15	38.5	6	15.4	5	12.8
13.	Mitchell Village	9	13.0	12	17.4	35	50.7	11	15.9	2	2.9
14.	Cape Carterett	24	30.0	25	31.3	22	27.5	8	10.0	1	1.3
15.	Bogue Banks	7	8.9	12	15.2	29	36.7	17	21.5	14	17.7
Total/Average		263	29.1	261	28.9	266	29.5	65	7.3	48	5.4

Table 5. Question 2: How often do each of the following insects bother you out-of-doors?

Biting gnats		Very Often		Quite Often		Once in a While		Hardly Ever		N.R.	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	22	19.6	20	17.9	54	48.2	13	11.6	3	2.7
2.	Stacy	9	31.0	10	34.5	9	31.0	1	3.4	0	0.0
3.	Davis	5	13.9	9	25.0	11	30.5	5	13.9	6	16.7
4.	Williston	15	39.5	14	36.8	6	15.8	2	5.3	1	2.6
5.	Symrna	15	25.9	15	25.9	21	36.2	6	10.3	1	1.7
6.	Harkers Island	12	18.5	22	33.8	24	36.9	5	7.7	2	3.1
7.	Yucca Village	10	23.3	16	37.2	15	34.9	1	2.3	1	2.3
8.	U. S. 70	2	8.3	6	25.0	9	37.5	1	4.2	6	25.0
9.	N. Newport River	32	35.2	30	33.0	17	18.7	2	2.2	10	11.0
10.	Newport	14	20.6	13	19.1	24	35.3	13	19.1	4	5.9
11.	Country Club Rd.	22	30.5	20	27.8	19	26.4	7	9.7	4	5.5
12.	Crab Point	21	53.8	10	25.6	6	15.4	1	2.6	1	2.6
13.	Mitchell Village	16	23.2	12	17.4	22	31.9	15	21.7	4	5.8
14.	Cape Carterett	38	47.5	22	27.5	13	16.3	4	5.0	3	3.8
15.	Bogue Banks	19	24.0	25	31.6	25	31.6	7	8.9	3	3.8
Total/Average		252	27.9	244	27.0	275	30.4	83	9.2	49	5.6

Table 6. Question 2: How often do each of the following insects bother you out-of-doors?

Greenheads		Very Often		Quite Often		Once in a While		Hardly Ever		N.R.	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	19	17.0	30	26.9	49	43.8	12	10.7	2	1.8
2.	Stacy	6	20.7	6	20.7	12	41.4	3	10.3	2	6.9
3.	Davis	8	22.2	7	19.4	16	44.4	2	5.5	3	8.3
4.	Williston	8	21.1	5	13.2	15	39.5	7	18.4	3	7.9
5.	Symrna	3	5.2	18	31.0	26	44.8	6	10.3	5	8.6
6.	Harkers Island	8	12.3	11	16.9	24	36.9	15	23.1	7	10.8
7.	Yucca Village	4	9.3	10	23.6	18	41.9	9	20.9	2	4.6
8.	U. S. 70	4	16.7	2	8.3	9	37.5	6	25.0	3	12.5
9.	N. Newport River	18	19.8	10	11.0	35	38.5	17	18.7	11	12.1
10.	Newport	7	10.3	5	7.3	22	32.3	27	39.7	7	10.3
11.	Country Club Rd.	5	6.9	13	18.1	27	37.5	18	25.0	9	12.5
12.	Crab Point	8	20.5	3	7.7	10	25.6	12	30.8	6	15.4
13.	Mitchell Village	2	2.9	3	4.3	20	30.0	35	50.7	9	13.0
14.	Cape Carterett	11	13.8	14	17.5	23	28.8	26	32.5	6	7.5
15.	Bogue Banks	3	3.8	7	8.9	25	31.6	26	32.5	18	22.8
Total/Average		114	12.6	144	15.9	331	36.7	221	24.5	93	10.3

Table 7. Question 3a: Are mosquitoes as "bad" now as they used to be (10-15 years ago)?

	Not as Bad		Same		Worse Now		Don't Know		N.R.	
	#	%*	#	%*	#	%*	#	%	#	%
1. Atlantic	76	76.8	18	18.2	5	5.0	12	10.7	1	0.9
2. Stacy	16	59.3	7	25.9	4	14.8	2	6.9	0	0.0
3. Davis	25	80.6	6	19.4	0	0.0	3	8.3	2	5.5
4. Williston	27	75.0	4	11.1	5	13.9	2	5.3	0	0.0
5. Symrna	28	58.3	16	33.3	4	8.3	9	15.5	1	1.7
6. Harkers Island	45	80.4	9	16.1	2	3.6	9	13.8	0	0.0
7. Yucca Village	20	58.8	12	35.3	2	5.9	9	20.9	0	0.0
8. U. S. 70	16	76.2	1	4.8	4	19.0	3	12.5	0	0.0
9. N. Newport River	36	53.7	21	31.3	10	14.9	23	25.3	1	1.1
10. Newport	27	58.7	7	15.2	12	26.1	22	32.3	0	0.0
11. Country Club Rd.	27	52.9	14	27.4	10	19.6	21	2.2	0	0.0
12. Crab Point	17	58.6	7	24.1	5	17.2	9	23.1	1	2.6
13. Mitchell Village	32	69.6	12	26.1	2	4.3	21	30.4	2	2.9
14. Cape Carterett	25	47.2	18	34.0	10	18.9	27	33.8	0	0.0
15. Bogue Banks	27	58.7	11	23.9	8	17.4	33	41.8	0	0.0
Total/Average	444	63.6	163	23.3	83	11.9	205	22.7	8	1.0

*Percents based on those who could make the comparison.

Table 8. Question 3b: Are other biting flies and gnats as "bad" as they used to be (10-15 years ago)?

	Not as Bad		Same		Worse Now		Don't Know		N.R.	
	#	%*	#	%*	#	%*	#	%	#	%
1. Atlantic	47	51.6	32	35.2	12	13.2	21	18.8	0	0.0
2. Stacy	5	19.2	16	61.5	5	19.2	3	10.3	0	0.0
3. Davis	14	45.2	14	45.2	3	9.7	3	8.3	2	5.6
4. Williston	13	36.1	11	30.6	12	33.3	1	2.6	1	2.6
5. Symrna	14	30.4	23	50.0	9	19.6	12	20.7	0	0.0
6. Harkers Island	29	52.7	25	45.4	1	1.8	10	15.4	0	0.0
7. Yucca Village	10	29.4	18	52.9	6	17.6	9	20.9	0	0.0
8. U. S. 70	8	40.0	6	30.0	6	30.0	4	16.7	0	0.0
9. N. Newport River	18	26.1	36	52.2	15	21.7	21	23.1	1	1.1
10. Newport	16	34.8	18	39.1	12	26.1	22	32.3	0	0.0
11. Country Club Rd.	12	26.7	23	51.1	10	22.2	25	34.7	2	2.8
12. Crab Point	9	32.1	14	50.0	5	17.9	11	28.2	0	0.0
13. Mitchell Village	23	50.0	18	39.1	5	10.9	22	31.9	1	1.5
14. Cape Carterett	16	29.6	29	53.7	9	16.7	26	32.5	0	0.0
15. Bogue Banks	15	33.3	22	48.9	8	17.8	34	43.0	0	0.0
Total/Average	249	37.0	305	45.4	118	17.6	224	24.8	7	0.9

*Percentages based on those who could make the comparison.

Table 9. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Yardwork	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Atlantic	111	100.0	0	0.0	0	0.0	1	1.8
2. Stacy	29	100.0	0	0.0	0	0.0	0	0.0
3. Davis	35	100.0	0	0.0	0	0.0	1	2.8
4. Williston	36	100.0	0	0.0	1	2.6	1	2.6
5. Symrna	56	100.0	0	0.0	1	1.7	1	1.7
6. Harkers Island	62	100.0	0	0.0	2	3.1	1	1.5
7. Yucca Village	42	97.7	1	2.3	0	0.0	0	0.0
8. U. S. 70	22	95.6	1	4.2	1	4.2	0	0.0
9. N. Newport River	89	98.9	1	1.1	0	0.0	1	1.1
10. Newport	61	89.7	7	10.3	0	0.0	0	0.0
11. Country Club Rd.	67	93.1	5	6.9	0	0.0	0	0.0
12. Crab Point	38	97.4	1	2.6	0	0.0	0	0.0
13. Mitchell Village	53	81.5	12	18.5	3	4.3	1	1.5
14. Cape Carterett	75	97.4	2	2.6	0	0.0	3	3.8
15. Bogue Banks	68	94.4	4	5.6	1	1.3	6	7.6
Total/Average	844	96.1	34	3.9	9	1.0	16	1.8

*Percents based on those who participate.

Table 10. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Golf	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Atlantic	6	100.0	0	0.0	76	67.9	30	26.8
2. Stacy	2	100.0	0	0.0	22	75.9	5	17.2
3. Davis	0	0.0	0	0.0	24	66.7	12	33.3
4. Williston	4	66.7	2	33.3	22	57.9	10	26.3
5. Symrna	1	25.0	3	75.0	42	72.4	12	20.7
6. Harkers Island	3	37.5	5	62.5	38	58.5	19	29.2
7. Yucca Village	0	0.0	1	100.0	31	72.1	11	25.6
8. U. S. 70	2	66.7	1	33.3	13	54.2	8	33.8
9. N. Newport River	7	100.0	0	0.0	58	63.7	26	28.6
10. Newport	6	54.5	5	45.5	49	72.1	8	11.8
11. Country Club Rd.	24	87.1	7	12.9	32	44.4	9	13.9
12. Crab Point	4	100.0	0	0.0	24	61.5	11	28.2
13. Mitchell Village	11	64.7	6	35.3	46	66.7	6	10.1
14. Cape Carterett	9	69.2	4	30.8	51	63.8	16	20.0
15. Bogue Banks	25	83.3	5	16.7	36	45.6	13	17.7
Total/Average	104	72.7	39	27.3	564	62.5	196	22.0

*Percents based on those who participate.

Table 11. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Fishing	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Atlantic	72	97.3	2	2.7	27	24.1	11	9.8
2. Stacy	24	100.0	0	0.0	3	10.3	2	6.9
3. Davis	20	100.0	0	0.0	8	22.2	8	22.2
4. Williston	25	100.0	0	0.0	8	21.1	5	13.2
5. Symrna	36	87.8	5	12.2	12	20.7	5	8.6
6. Harkers Island	44	93.6	3	6.4	8	12.3	10	13.4
7. Yucca Village	23	88.5	3	11.5	8	18.6	9	20.9
8. U. S. 70	13	81.3	3	18.7	3	12.5	5	20.4
9. N. Newport River	58	93.6	4	6.4	19	20.9	10	11.0
10. Newport	42	87.5	6	12.5	16	23.9	4	5.9
11. Country Club Rd.	32	57.1	14	42.9	17	23.6	9	12.5
12. Crab Point	14	70.0	6	30.0	7	17.9	8	20.5
13. Mitchell Village	29	69.0	13	31.0	20	29.0	7	10.1
14. Cape Carterett	56	91.8	5	8.2	10	12.5	9	11.3
15. Bogue Banks	52	88.1	7	11.9	7	8.9	13	16.5
Total/Average	540	88.4	71	11.6	173	19.2	119	13.2

*Percents based on those who participate.

Table 12. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Hunting	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Atlantic	46	95.8	2	4.2	46	41.1	18	16.1
2. Stacy	13	81.2	3	18.0	9	31.0	4	13.8
3. Davis	7	87.5	1	12.5	18	50.0	10	27.8
4. Williston	11	91.7	1	8.3	16	42.1	10	26.3
5. Symrna	15	88.2	2	11.8	32	55.2	9	15.5
6. Harkers Island	23	82.1	5	17.9	22	33.8	15	23.1
7. Yucca Village	16	94.1	1	5.9	16	37.2	10	23.3
8. U. S. 70	10	90.9	1	9.1	7	29.2	6	25.0
9. N. Newport River	43	97.7	1	2.3	32	35.2	15	16.5
10. Newport	29	76.3	7	23.7	28	41.2	4	5.9
11. Country Club Rd.	19	73.1	7	26.9	35	48.6	13	18.1
12. Crab Point	9	90.0	1	10.0	16	41.0	14	35.9
13. Mitchell Village	18	78.3	5	21.7	38	55.1	8	11.6
14. Cape Carterett	30	96.8	1	3.2	32	40.0	17	21.3
15. Bogue Banks	20	80.0	5	20.0	33	41.8	21	26.6
Total/Average	309	87.8	43	12.2	380	42.1	171	18.9

*Percents based on those who participate.

Table 13. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Swimming	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Atlantic	65	91.5	6	8.5	27	24.1	14	12.5
2. Stacy	14	73.7	5	22.3	7	24.1	3	10.3
3. Davis	16	88.9	2	11.1	7	19.4	11	30.5
4. Williston	19	95.0	1	5.0	10	26.3	8	21.1
5. Symrna	22	75.9	7	24.1	18	31.1	11	19.0
6. Harkers Island	39	95.1	2	4.9	14	21.5	10	15.4
7. Yucca Village	23	85.2	4	14.8	7	16.3	9	20.9
8. U. S. 70	10	83.3	2	16.7	6	25.0	6	25.0
9. N. Newport River	47	79.7	12	20.3	16	17.6	16	17.6
10. Newport	31	62.0	19	38.0	13	19.1	5	7.3
11. Country Club Rd.	40	64.5	22	35.5	3	4.2	7	9.7
12. Crab Point	18	78.3	5	21.7	6	15.4	10	25.6
13. Mitchell Village	30	71.4	12	28.6	17	24.6	10	14.5
14. Cape Carterett	39	73.6	14	26.4	11	13.8	16	20.0
15. Bogue Banks	26	54.2	22	45.8	10	12.7	21	26.6
Total/Average	439	76.5	135	23.5	172	19.0	157	17.4

*Percents based on those who participate.

Table 14. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Boating	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Atlantic	75	92.6	6	7.4	18	16.1	14	12.5
2. Stacy	19	79.2	5	20.8	2	6.9	3	10.3
3. Davis	18	100.0	0	0.0	7	19.4	11	30.5
4. Williston	19	90.5	2	9.5	10	26.3	7	18.4
5. Symrna	38	84.4	7	15.6	9	15.5	4	6.9
6. Harkers Island	41	87.2	6	12.8	7	10.8	11	16.9
7. Yucca Village	26	78.8	7	21.2	4	9.3	6	13.9
8. U. S. 70	13	92.9	1	7.1	5	20.8	5	20.8
9. N. Newport River	45	76.3	14	23.7	17	18.7	15	16.5
10. Newport	29	69.0	13	31.0	21	30.9	5	7.3
11. Country Club Rd.	29	61.7	18	38.3	13	18.1	12	16.7
12. Crab Point	15	75.0	5	25.0	8	20.5	11	28.2
13. Mitchell Village	29	72.5	11	27.5	20	29.0	9	13.0
14. Cape Carterett	43	81.1	10	18.9	16	20.0	11	13.8
15. Bogue Banks	34	64.1	19	35.9	11	13.9	15	19.0
Total/Average	473	79.2	124	20.8	168	18.6	138	15.3

*Percents based on those who participate.

Table 15. Question 6: If you use an insect repellent on yourself, how satisfied are you with the protection it gives?

		Very Satis.		Satis.		Not Satis.		Don't Use		N.R.	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	8	7.1	43	38.4	38	33.9	20	17.9	3	2.7
2.	Stacy	2	6.9	11	37.9	12	41.4	4	13.8	0	0.0
3.	Davis	2	5.6	10	27.8	13	36.1	9	25.0	2	5.6
4.	Williston	1	2.6	5	13.2	20	52.6	10	26.3	2	5.3
5.	Symrna	4	6.9	22	37.9	19	32.8	13	22.4	0	0.0
6.	Harkers Island	7	10.8	23	35.4	16	24.6	19	29.2	0	0.0
7.	Yucca Village	2	4.6	21	48.8	7	16.3	13	30.2	0	0.0
8.	U. S. 70	2	8.3	10	41.7	9	37.5	3	12.5	0	0.0
9.	N. Newport River	2	2.2	29	31.9	44	48.3	15	16.5	1	1.1
10.	Newport	4	5.9	14	20.6	30	44.1	17	25.0	3	4.4
11.	Country Club Rd.	5	6.9	24	33.3	33	45.8	9	13.9	1	1.4
12.	Crab Point	1	2.6	10	25.6	18	46.1	10	28.2	0	0.0
13.	Mitchell Village	4	5.8	30	43.5	20	29.0	13	18.8	2	4.4
14.	Cape Carterett	4	5.0	32	40.0	34	42.5	9	11.3	1	1.3
15.	Bogue Banks	4	5.1	28	35.4	27	34.2	18	22.8	2	2.5
Total/Average		52	5.8	312	34.5	340	37.6	182	20.2	17	1.9

Table 16. Question 7: Do you think there should be more community effort devoted to the control of biting insects in this area?

		Need More		Need Less		Adequate Now		No Opinion		N.R.	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	106	94.6	0	0.0	0	0.0	2	1.8	4	3.6
2.	Stacy	28	96.5	0	0.0	0	0.0	1	3.4	0	0.0
3.	Davis	33	91.7	1	2.8	0	0.0	1	2.8	1	2.8
4.	Williston	34	89.5	0	0.0	1	2.6	3	7.9	0	0.0
5.	Symrna	51	87.9	0	0.0	4	6.9	3	5.2	0	0.0
6.	Harkers Island	56	86.1	0	0.0	4	6.1	3	4.6	2	3.1
7.	Yucca Village	35	81.4	2	4.6	1	2.3	3	7.0	2	4.6
8.	U. S. 70	19	79.2	0	0.0	2	8.3	3	12.5	0	0.0
9.	N. Newport River	80	87.9	1	1.1	3	3.3	5	5.5	2	2.2
10.	Newport	51	75.0	0	0.0	7	10.3	8	11.8	2	2.9
11.	Country Club Rd.	59	81.9	2	2.8	7	9.7	3	4.2	1	1.4
12.	Crab Point	35	89.7	0	0.0	1	2.6	0	0.0	3	7.7
13.	Mitchell Village	42	60.9	7	10.1	14	20.3	4	5.8	2	2.9
14.	Cape Carterett	68	85.0	0	0.0	6	7.5	6	7.5	0	0.0
15.	Bogue Banks	63	79.7	2	2.5	7	8.9	4	5.1	3	3.8
Total/Average		760	84.2	15	1.6	57	6.3	49	5.4	22	2.4

Table 17. Question 8: How much would it be "worth" to you to have better control of biting insects in this area?

		\$5-10		\$2-5		\$1		Nothing		N.R.	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	55	49.1	39	34.8	5	4.5	6	5.4	7	6.3
2.	Stacy	18	62.1	3	10.3	2	6.9	5	17.2	1	3.4
3.	Davis	18	50.0	10	27.7	2	5.6	2	5.6	4	11.1
4.	Williston	20	52.6	12	31.6	3	7.9	2	5.3	1	2.6
5.	Symrna	30	51.7	14	24.1	3	5.2	7	12.1	4	6.9
6.	Harkers Island	28	42.1	16	24.6	9	13.8	5	7.7	7	10.8
7.	Yucca Village	13	30.2	9	20.9	3	7.0	10	23.3	8	18.6
8.	U. S. 70	9	37.5	9	37.5	2	8.3	4	16.7	0	0.0
9.	N. Newport River	45	49.4	24	26.4	9	9.9	8	8.8	5	5.5
10.	Newport	23	33.8	26	38.2	8	11.8	7	10.3	4	5.9
11.	Country Club Rd.	33	45.8	22	30.5	1	1.4	10	13.9	6	8.3
12.	Crab Point	18	46.1	12	30.8	6	15.4	0	0.0	3	7.7
13.	Mitchell Village	25	36.2	18	26.1	5	7.2	14	20.3	7	10.1
14.	Cape Carterett	37	46.3	18	22.5	10	12.5	8	10.0	7	8.8
15.	Bogue Banks	36	45.6	24	30.4	5	6.3	8	10.1	6	7.6
Total/Average		408	45.2	256	28.3	73	8.1	96	10.6	70	7.8

Table 18. Question 9: If you are a property owner do you think your property would increase in value if there were fewer biting insects?

		Yes		No		Undecided		Not a Property Owner		N.R.	
		#	%*	#	%*	#	%*	#	%	#	%
1.	Atlantic	74	74.7	15	15.2	10	10.1	12	10.7	1	0.9
2.	Stacy	18	72.0	2	8.0	5	20.0	3	10.3	1	3.4
3.	Davis	19	55.9	9	26.5	6	17.6	2	5.6	0	0.0
4.	Williston	27	75.0	3	8.3	6	16.7	1	2.6	1	2.6
5.	Symrna	33	63.5	10	19.2	9	17.3	6	10.3	0	0.0
6.	Harkers Island	29	52.7	15	27.3	11	20.0	7	10.8	3	4.6
7.	Yucca Village	18	52.9	12	35.3	4	11.8	7	16.3	2	4.6
8.	U. S. 70	14	63.6	4	18.2	4	18.2	2	8.3	0	0.0
9.	N. Newport River	43	60.6	8	11.3	20	28.2	18	19.8	2	2.2
10.	Newport	15	31.9	24	51.1	8	17.0	21	30.9	0	0.0
11.	Country Club Rd.	30	43.5	28	40.6	11	15.9	3	4.2	0	0.0
12.	Crab Point	20	57.1	10	28.6	5	14.3	4	10.3	0	0.0
13.	Mitchell Vlg.	23	35.9	10	15.6	31	48.4	5	7.2	0	0.0
14.	Cape Caterett	35	60.3	18	31.0	5	8.6	22	27.5	0	0.0
15.	Bogue Banks	31	45.6	25	37.8	12	17.6	11	13.9	0	0.0
Total/Average		429	55.8	193	25.1	147	19.1	124	13.7	10	1.1

*Percents based on number of property owners.

Table 19. Question 10: If you are a visitor to this area, would you come more often if there were fewer biting insects?

		<u>Yes</u>		<u>No</u>		<u>Undecided</u>		<u>Not a visitor</u>		<u>N.R.</u>	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	1	100.0	0	0.0	0	0.0	111	99.1	0	0.0
2.	Stacy	1	100.0	0	0.0	0	0.0	28	96.5	0	0.0
3.	Davis	1	100.0	0	0.0	0	0.0	35	97.2	0	0.0
4.	Williston	1	100.0	0	0.0	0	0.0	37	97.4	0	0.0
5.	Symrna	0	0.0	0	0.0	0	0.0	58	100.0	0	0.0
6.	Harkers Island	0	0.0	0	0.0	0	0.0	65	100.0	0	0.0
7.	Yucca Village	0	0.0	0	0.0	0	0.0	43	100.0	0	0.0
8.	U. S. 70	0	0.0	0	0.0	0	0.0	24	100.0	0	0.0
9.	N. Newport River	2	100.0	0	0.0	0	0.0	89	97.8	0	0.0
10.	Newport	1	100.0	0	0.0	0	0.0	67	98.5	0	0.0
11.	Country Club Rd.	0	0.0	1	100.0	0	0.0	71	98.6	0	0.0
12.	Crab Point	0	0.0	0	0.0	0	0.0	39	100.0	0	0.0
13.	Mitchell Village	0	0.0	0	0.0	0	0.0	69	100.0	0	0.0
14.	Cape Carterett	0	0.0	0	0.0	0	0.0	80	100.0	0	0.0
15.	Bogue Banks	2	66.7	1	33.3	0	0.0	76	96.2	0	0.0
Total/Average		9	81.8	2	18.2	0	0.0	892	98.8	0	0.0

*Percents based on those who could make the comparison.

Table 20. Question 11: To what extent do you think each of the following is a problem in this area?

<u>Biting insects</u>		<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	92	82.1	18	16.1	1	0.9	0	0.0	1	0.9
2.	Stacy	24	82.7	4	13.8	1	3.4	0	0.0	0	0.0
3.	Davis	19	52.8	16	44.4	0	0.0	0	0.0	1	2.8
4.	Williston	27	71.1	10	26.3	0	0.0	0	0.0	1	2.6
5.	Symrna	30	51.7	23	39.7	4	6.9	0	0.0	1	1.7
6.	Harkers Island	33	50.8	26	40.0	4	6.1	0	0.0	2	3.1
7.	Yucca Village	22	51.2	16	37.2	3	7.0	0	0.0	2	4.6
8.	U. S. 70	15	62.5	6	25.0	3	12.5	0	0.0	0	4.2
9.	N. Newport River	58	63.7	30	33.0	0	0.0	0	0.0	3	3.3
10.	Newport	27	39.7	28	41.2	10	14.7	1	1.5	2	2.9
11.	Country Club Rd.	36	50.0	28	38.9	6	8.3	1	1.4	1	1.4
12.	Crab Point	19	48.7	16	41.0	2	5.1	0	0.0	2	5.1
13.	Mitchell Village	17	24.6	34	49.3	13	18.8	3	4.3	2	4.3
14.	Cape Carterett	48	60.0	22	27.5	7	8.8	1	1.3	2	2.5
15.	Bogue Banks	34	43.0	32	40.5	11	13.9	0	0.0	2	3.8
Total/Average		501	55.5	309	34.2	65	7.2	6	0.7	22	2.8

Table 21. Question 11: To what extent do you think each of the following is a problem in this area?

<u>Waste Disposal</u>		<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	38	33.9	37	33.0	11	9.8	9	8.0	17	15.2
2.	Stacy	6	20.7	10	34.5	5	17.2	4	13.8	4	13.8
3.	Davis	11	30.6	12	33.3	4	11.1	4	11.1	5	13.9
4.	Williston	17	44.7	7	18.4	9	23.7	2	5.3	3	7.9
5.	Symrna	15	25.9	18	31.0	13	22.4	5	8.6	7	12.1
6.	Harkers Island	24	36.9	25	38.5	6	9.2	3	4.6	7	10.8
7.	Yucca Village	15	34.9	15	34.9	3	7.0	5	11.6	5	11.6
8.	U. S. 70	12	50.0	3	12.5	3	12.7	0	0.0	6	25.0
9.	N. Newport River	32	35.2	28	30.8	15	16.5	6	6.6	10	11.0
10.	Newport	23	33.8	25	36.8	7	10.3	6	8.6	7	10.3
11.	Country Club Rd.	38	52.3	13	18.1	15	20.8	2	2.8	4	5.5
12.	Crab Point	20	51.3	8	20.5	5	12.8	1	2.6	5	12.8
13.	Mitchell Village	31	44.9	15	21.7	12	17.4	5	7.2	6	8.7
14.	Cape Carterett	20	25.0	20	25.0	20	25.0	11	13.8	9	11.3
15.	Bogue Banks	32	40.5	22	27.8	8	10.1	10	12.7	7	8.9
Total/Average		334	37.0	258	28.6	136	15.1	73	8.1	102	11.3

Table 22. Question 11: To what extent do you think each of the following is a problem in this area?

<u>Water Supply</u>		<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
		#	%	#	%	#	%	#	%	#	%
1.	Atlantic	4	3.6	13	11.6	22	19.6	47	42.0	26	23.2
2.	Stacy	1	3.4	9	31.0	6	20.7	8	27.6	5	17.2
3.	Davis	4	11.1	12	33.3	6	16.7	8	22.2	6	16.7
4.	Williston	6	15.8	5	13.2	8	21.1	12	31.6	7	18.4
5.	Symrna	2	3.4	6	10.3	15	25.9	25	43.1	10	17.2
6.	Harkers Island	4	6.1	8	12.3	9	13.8	28	43.1	16	24.6
7.	Yucca Village	5	11.6	8	18.6	10	23.3	12	27.9	8	18.6
8.	U. S. 70	4	16.7	4	16.7	3	12.5	7	29.2	6	25.0
9.	N. Newport River	8	8.8	22	24.2	21	23.1	29	31.9	11	12.1
10.	Newport	8	11.8	13	19.1	16	23.5	21	30.9	10	14.7
11.	Country Club Rd.	7	9.7	17	23.6	18	25.0	25	34.7	5	6.9
12.	Crab Point	5	12.8	5	12.8	9	23.1	13	33.3	7	17.9
13.	Mitchell Village	6	8.7	23	33.3	15	21.7	15	21.7	10	14.5
14.	Cape Carterett	12	15.0	19	23.8	13	16.3	26	32.5	10	12.5
15.	Bogue Banks	8	10.1	11	13.9	17	21.5	33	41.8	10	12.7
Total/Average		84	9.3	175	19.4	188	20.8	309	34.2	147	16.3

Table 23. Question 11: To what extent do you think each of the following is a problem in this area?

Air Pollution	Serious		Moderate		Slight		None		N.R.	
	#	%	#	%	#	%	#	%	#	%
1. Atlantic	11	9.8	13	11.6	37	33.0	31	27.7	21	18.7
2. Stacy	2	6.9	7	24.1	11	37.9	6	20.7	3	10.3
3. Davis	0	0.0	6	16.7	12	33.3	11	30.6	7	19.4
4. Williston	2	5.3	8	21.1	17	44.7	4	10.5	7	18.4
5. Symrna	4	6.9	17	29.3	18	31.0	9	15.5	10	17.2
6. Harkers Island	10	15.4	9	13.8	17	26.1	13	20.0	13	20.0
7. Yucca Village	8	18.6	10	22.3	15	34.9	3	7.0	7	16.3
8. U. S. 70	4	16.7	3	12.5	7	29.2	3	12.5	7	29.2
9. N. Newport River	16	17.6	30	33.0	22	24.2	13	14.3	10	11.0
10. Newport	7	10.3	16	23.5	34	50.0	5	7.3	6	8.8
11. Country Club Rd.	5	6.9	25	34.7	27	37.5	10	13.9	5	6.9
12. Crab Point	8	20.5	11	28.2	11	28.2	4	10.3	5	12.8
13. Mitchell Village	10	14.5	24	34.8	24	34.8	5	7.2	7	10.1
14. Cape Carterett	6	7.5	13	16.3	26	32.5	23	28.8	13	16.3
15. Bogue Banks	2	2.5	9	11.4	41	51.9	18	22.8	9	11.4
Total/Average	95	10.5	201	22.3	319	35.3	158	17.5	130	14.4

Table 24. Question 11: To what extent do you think each of the following is a problem in this area?

Area Beautification	Serious		Moderate		Slight		None		N.R.	
	#	%	#	%	#	%	#	%	#	%
1. Atlantic	31	27.7	45	40.2	16	14.3	5	4.5	15	14.3
2. Stacy	7	24.1	15	51.7	3	10.3	2	6.9	2	6.9
3. Davis	10	27.8	11	30.6	6	16.7	4	11.1	5	13.9
4. Williston	11	28.9	13	34.2	5	13.2	2	5.3	7	18.4
5. Symrna	26	44.8	15	25.9	8	13.8	4	6.9	5	8.6
6. Harkers Island	23	35.4	14	21.5	12	18.5	5	7.7	11	16.9
7. Yucca Village	10	23.3	16	37.2	7	16.2	2	4.6	8	18.6
8. U. S. 70	4	16.7	3	12.5	7	29.2	3	12.5	7	29.2
9. N. Newport River	19	20.9	35	38.5	19	20.9	7	7.7	11	12.1
10. Newport	18	26.5	18	26.5	21	30.9	4	5.9	7	10.3
11. Country Club Rd.	10	13.9	29	40.3	20	27.8	8	11.1	5	6.9
12. Crab Point	14	35.9	11	28.2	7	17.9	2	5.1	5	12.8
13. Mitchell Village	17	24.6	27	29.1	13	18.8	3	4.3	9	13.0
14. Cape Carterett	23	28.8	21	26.3	18	22.5	8	10.0	10	12.5
15. Bogue Banks	28	35.4	24	30.4	9	11.4	9	11.4	9	11.4
Total/Average	251	27.8	297	32.9	171	18.9	68	7.5	116	12.9

Table 25. Question 11: To what extent do you think each of the following is a problem in this area?

Water Pollution	Serious		Moderate		Slight		None		N.R.	
	#	%	#	%	#	%	#	%	#	%
1. Atlantic	33	29.5	31	27.7	21	18.7	10	8.9	17	15.2
2. Stacy	6	20.6	7	24.1	9	31.0	4	13.8	3	10.3
3. Davis	5	13.9	10	27.8	8	22.2	6	16.7	7	19.4
4. Williston	18	37.4	6	15.8	3	7.9	2	5.3	9	23.7
5. Symrna	18	31.0	23	39.7	7	12.1	5	8.6	5	8.6
6. Harkers Island	26	40.0	17	26.1	7	10.8	5	7.7	10	15.4
7. Yucca Village	16	37.2	13	30.3	9	20.9	1	2.3	4	9.3
8. U. S. 70	8	33.3	5	20.8	3	12.5	2	8.3	6	25.0
9. N. Newport River	47	51.6	18	19.8	11	12.1	4	4.4	11	12.1
10. Newport	29	42.6	23	33.8	9	13.2	2	2.9	6	8.8
11. Country Club Rd.	37	51.4	18	25.5	8	11.1	6	8.3	3	4.2
12. Crab Point	24	61.5	4	10.3	5	12.8	1	2.6	5	12.8
13. Mitchell Village	42	60.9	12	17.4	7	10.1	3	4.3	5	7.2
14. Cape Carterett	18	22.5	20	25.0	21	26.3	8	10.0	13	16.3
15. Bogue Banks	24	30.4	25	31.6	14	17.7	8	10.1	7	8.9
Total/Average	351	38.9	232	25.7	142	15.7	67	7.4	111	12.3

Table 26. Question 11: To what extent do you think each of the following is a problem in this area?

Housing	Serious		Moderate		Slight		None		N.R.	
	#	%	#	%	#	%	#	%	#	%
1. Atlantic	16	14.3	32	28.6	20	17.9	17	15.2	26	23.2
2. Stacy	2	6.9	3	10.2	8	27.6	9	31.0	7	24.1
3. Davis	5	13.9	8	22.2	10	27.8	6	16.7	7	19.4
4. Williston	5	13.2	6	15.8	11	28.9	6	15.8	10	26.3
5. Symrna	5	8.6	14	24.1	17	29.3	9	15.5	13	22.4
6. Harkers Island	5	7.7	17	26.1	15	23.1	10	15.4	18	27.7
7. Yucca Village	3	7.0	15	34.9	11	25.6	7	16.3	7	16.3
8. U. S. 70	3	12.5	10	41.7	2	8.3	3	12.5	6	25.0
9. N. Newport River	23	25.3	29	31.9	14	15.4	11	12.1	14	15.4
10. Newport	14	20.6	21	30.9	16	23.4	8	11.8	9	13.2
11. Country Club Rd.	9	12.5	26	36.1	18	25.0	13	18.1	6	8.3
12. Crab Point	13	33.3	13	33.3	3	7.7	5	12.8	5	12.8
13. Mitchell Village	15	21.7	26	37.7	13	18.8	6	8.7	9	13.0
14. Cape Carterett	7	8.8	18	22.5	23	28.8	20	25.0	12	15.0
15. Bogue Banks	10	12.7	20	25.3	23	29.1	14	17.7	13	16.5
Total/Average	135	14.9	258	28.6	204	22.6	144	15.9	162	17.9

Table 27. Question 11: To what extent do you think each of the following is a problem in this area?

Protection of the Environment	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Atlantic	36	32.1	29	25.9	17	15.2	9	8.0	21	19.6
2. Stacy	3	10.2	13	44.8	4	13.8	4	13.8	5	17.2
3. Davis	9	25.0	10	27.8	5	13.9	6	16.7	6	16.7
4. Williston	9	23.7	11	28.9	7	18.4	2	5.3	9	23.7
5. Symrna	28	48.3	10	17.2	6	10.3	4	6.9	10	17.2
6. Harkers Island	27	41.5	14	21.5	6	9.2	2	3.1	16	24.6
7. Yucca Village	12	27.9	14	32.6	9	20.9	0	0.0	8	18.6
8. U. S. 70	9	37.5	4	16.7	3	12.5	2	8.3	6	25.0
9. N. Newport River	33	36.3	21	23.1	15	16.5	8	8.8	14	15.4
10. Newport	18	26.5	18	26.5	21	30.9	4	5.9	7	11.8
11. Country Club Rd.	30	41.7	24	33.3	8	11.1	6	8.3	4	5.5
12. Crab Point	22	56.4	5	12.8	5	12.8	3	7.7	4	10.3
13. Mitchell Village	35	50.7	19	27.5	10	14.5	3	4.3	2	4.3
14. Cape Carterett	25	31.3	18	22.5	18	22.5	9	11.3	10	13.8
15. Bogue Banks	41	51.9	23	29.1	5	6.3	2	2.5	8	11.4
Total/Average	337	37.3	233	25.8	139	15.4	64	7.1	130	14.4

Table 28. Question 12: Which of the following are you?

	<u>Resident</u>		<u>Non-resident property owner</u>		<u>Visitor</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%
1. Atlantic	110	98.2	2	1.8	0	0.0	0	0.0
2. Stacy	27	93.1	1	3.4	1	3.4	0	0.0
3. Davis	34	94.4	1	2.8	1	2.8	0	0.0
4. Williston	36	94.7	0	0.0	0	0.0	1	2.6
5. Symrna	54	93.1	4	6.9	0	0.0	0	0.0
6. Harkers Island	63	96.9	2	3.1	0	0.0	0	0.0
7. Yucca Village	42	97.7	1	2.3	0	0.0	0	0.0
8. U. S. 70	22	91.7	1	4.2	0	0.0	1	4.2
9. N. Newport River	90	98.9	0	0.0	1	1.1	0	0.0
10. Newport	67	98.5	0	0.0	1	1.5	0	0.0
11. Country Club Rd.	71	98.6	0	0.0	1	1.4	0	0.0
12. Crab Point	39	100.0	0	0.0	0	0.0	0	0.0
13. Mitchell Village	65	94.2	4	5.8	0	0.0	0	0.0
14. Cape Carterett	77	96.3	3	3.8	0	0.0	0	0.0
15. Bogue Banks	57	72.1	19	24.0	2	3.5	1	1.3
Total/Average	854	94.6	38	4.2	8	0.9	3	0.3

Table 29. Question 13: Your sex?

	<u>Male</u>		<u>Female</u>		<u>N.R.</u>	
	#	%	#	%	#	%
1. Atlantic	65	58.0	46	41.1	1	0.9
2. Stacy	18	62.1	11	37.9	0	0.0
3. Davis	25	69.4	10	27.8	1	2.8
4. Williston	13	34.2	25	65.8	0	0.0
5. Symrna	41	70.7	17	29.3	0	0.0
6. Harkers Island	38	58.5	24	36.9	3	4.6
7. Yucca Village	22	51.2	20	46.5	1	2.3
8. U. S. 70	10	41.7	14	58.3	0	0.0
9. N. Newport River	63	69.2	26	28.6	2	2.2
10. Newport	49	72.1	19	27.9	0	0.0
11. Country Club Rd.	50	70.8	22	30.5	0	0.0
12. Crab Point	23	59.0	14	35.9	2	5.1
13. Mitchell Village	47	68.1	22	31.9	0	0.0
14. Cape Carterett	53	66.3	25	31.3	2	2.5
15. Bogue Banks	54	68.3	23	29.1	2	2.5
Total/Average	571	63.2	318	35.2	14	1.6

Table 30. Question 14: Your age?

	<u>18-25</u>		<u>25-40</u>		<u>Over 40</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%
1. Atlantic	9	8.0	24	21.4	78	69.6	1	0.9
2. Stacy	4	13.8	5	17.2	20	69.0	0	0.0
3. Davis	1	2.8	8	22.2	27	75.0	0	0.0
4. Williston	3	7.9	8	21.1	26	68.4	1	2.6
5. Symrna	5	8.6	9	15.5	43	74.1	1	1.7
6. Harkers Island	7	10.8	21	32.3	32	49.2	5	7.7
7. Yucca Village	5	11.6	15	34.9	23	53.5	0	0.0
8. U. S. 70	0	0.0	11	45.8	13	54.2	0	0.0
9. N. Newport River	20	22.0	21	23.1	48	52.7	2	2.2
10. Newport	17	25.0	18	26.5	28	41.2	5	7.3
11. Country Club Rd.	3	4.2	30	41.7	38	52.8	1	1.4
12. Crab Point	6	15.4	16	41.0	15	38.5	2	5.1
13. Mitchell Village	3	4.3	24	34.8	41	59.4	1	1.5
14. Cape Carterett	8	10.0	26	32.5	46	57.5	0	0.0
15. Bogue Banks	3	3.8	14	17.7	62	78.5	0	0.0
Total/Average	94	10.4	250	27.7	540	59.8	19	2.1

APPENDIX III PAMLICO COUNTY

Table 1. Responses to the mail survey by area.

	Distributed	Returned	% Return
1. Goose Creek	40	12	30.0
2. Vandemere	108	32	29.6
3. Bayboro	111	30	27.0
4. Oriental	80	25	31.3
5. Arapahoe	188	61	32.5
Total	527	160	30.4

Table 2. Question 1: How often are you bothered by biting insects out-of-doors?

	<u>Often</u>		<u>Sometimes</u>		<u>Seldom</u>		<u>Never</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	10	83.3	0	0.0	0	0.0	0	0.0	2	16.7
2. Vandemere	30	93.7	2	6.3	0	0.0	0	0.0	0	0.0
3. Bayboro	14	46.7	14	46.7	1	3.3	0	0.0	1	3.3
4. Oriental	20	80.0	5	20.0	0	0.0	0	0.0	0	0.0
5. Arapahoe	40	65.6	16	26.2	2	3.3	0	0.0	3	4.9
Total/Average	114	71.3	37	23.1	3	1.9	0	0.0	6	3.8

Table 3. Question 2: How often do each of the following insects bother you out-of-doors?

Mosquitoes	<u>Very often</u>		<u>Quite often</u>		<u>Once in a while</u>		<u>Hardly ever</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	10	83.3	2	16.7	0	0.0	0	0.0	0	0.0
2. Vandemere	18	56.3	10	31.2	4	12.5	0	0.0	0	0.0
3. Bayboro	8	26.7	9	30.0	10	33.3	3	3.3	0	0.0
4. Oriental	12	48.0	8	32.0	5	20.0	0	0.0	0	0.0
5. Arapahoe	18	29.5	26	42.6	17	27.9	0	0.0	0	0.0
Total/Average	66	41.3	55	34.4	36	22.5	3	1.9	0	0.0

Table 4. Question 2: How often do each of the following insects bother you out-of-doors?

Yellow flies	<u>Very often</u>		<u>Quite often</u>		<u>Once in a while</u>		<u>Hardly ever</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	4	33.3	6	50.0	2	16.7	0	0.0	0	0.0
2. Vandemere	10	31.3	9	28.1	13	40.6	0	0.0	0	0.0
3. Bayboro	7	23.3	10	33.3	11	36.7	1	3.3	1	3.3
4. Oriental	11	44.0	8	32.0	4	16.0	1	4.0	1	4.0
5. Arapahoe	20	32.8	26	42.6	13	21.3	0	0.0	2	3.3
Total/Average	52	32.5	59	36.9	43	26.9	2	1.3	4	2.5

Table 5. Question 2: How often do each of the following insects bother you out-of-doors?

Biting gnats	<u>Very often</u>		<u>Quite often</u>		<u>Once in a while</u>		<u>Hardly ever</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	1	8.3	6	50.0	2	16.7	3	25.0
2. Vandemere	4	12.5	9	28.1	12	37.5	4	12.5	3	9.4
3. Bayboro	6	20.0	3	10.0	11	36.7	5	16.7	5	16.7
4. Oriental	3	12.0	5	20.0	10	40.0	1	4.0	6	24.0
5. Arapahoe	13	21.3	20	32.8	19	31.1	6	9.8	3	4.9
Total/Average	26	16.3	28	23.8	58	36.3	18	11.3	20	12.5

Table 6. Question 2: How often do each of the following insects bother you out-of-doors?

Greenheads	<u>Very often</u>		<u>Quite often</u>		<u>Once in a while</u>		<u>Hardly ever</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	2	16.7	4	33.3	3	25.0	1	8.3	2	16.7
2. Vandemere	6	18.8	7	21.9	13	40.6	3	9.4	3	9.4
3. Bayboro	1	3.3	5	16.7	12	40.0	7	23.3	5	16.7
4. Oriental	5	20.0	3	12.0	7	28.0	2	8.0	8	32.0
5. Arapahoe	7	11.5	12	19.7	25	41.0	11	18.0	6	9.8
Total/Average	21	13.1	31	19.4	60	37.5	24	15.0	24	15.0

Table 7. Question 3a: Are mosquitoes as "bad" now as they used to be (10-15 years ago?)

	Not as bad		Same		Worse		Don't Know		N.R.	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	10	100.0	0	0.0	0	0.0	0	0.0	2	16.7
2. Vandemere	24	82.8	4	13.8	1	3.4	3	9.4	0	0.0
3. Bayboro	28	96.6	1	3.4	0	0.0	0	0.0	1	3.3
4. Oriental	18	72.0	4	16.0	3	12.0	0	0.0	0	0.0
5. Arapahoe	42	71.2	15	25.4	2	3.4	2	3.3	0	0.0
Total/Average	122	80.3	24	15.8	6	3.9	5	3.1	3	1.9

*Percents based on those who could make the comparison.

Table 8. Question 3b: Are other biting flies and gnats as "bad" now as they used to be (10-15 years ago?)

	Not as bad		Same		Worse		Don't Know		N.R.	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	6	60.0	3	30.0	1	10.0	0	0.0	2	16.7
2. Vandemere	12	40.0	12	40.0	6	20.0	2	6.3	0	0.0
3. Bayboro	15	51.7	10	34.5	4	13.8	1	3.3	0	0.0
4. Oriental	11	44.0	4	16.0	7	28.0	1	4.0	2	8.0
5. Arapahoe	21	35.6	31	52.5	7	11.9	1	1.6	1	1.6
Total/Average	65	43.3	60	40.0	25	16.7	5	3.1	5	3.1

*Percents based on those who could make the comparison.

Table 9. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Yardwork	Yes		No		Don't Participate		N.R.	
	#	%	#	%	#	%	#	%
1. Goose Creek	12	100.0	0	0.0	0	0.0	0	0.0
2. Vandemere	29	93.5	2	6.5	0	0.0	1	3.1
3. Bayboro	26	92.9	2	7.1	1	3.3	1	3.3
4. Oriental	23	95.8	1	4.2	0	0.0	1	4.0
5. Arapahoe	52	91.2	5	8.8	0	0.0	4	8.2
Total/Average	142	93.4	10	6.6	1	0.6	7	4.4

*Percents based on those who participate.

Table 10. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Golf	Yes		No		Don't Participate		N.R.	
	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	0	0.0	4	33.3	8	66.7
2. Vandemere	4	80.0	1	20.0	12	37.5	15	46.9
3. Bayboro	5	71.4	2	28.6	12	40.0	11	36.7
4. Oriental	3	75.0	1	25.0	8	32.0	13	52.0
5. Arapahoe	8	66.7	4	33.3	30	49.2	19	31.1
Total/Average	20	71.4	8	28.6	66	41.3	66	41.3

*Percents based on those who participate.

Table 11. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Fishing	Yes		No		Don't Participate		N.R.	
	#	%	#	%	#	%	#	%
1. Goose Creek	10	100.0	0	0.0	1	8.3	1	8.3
2. Vandemere	15	100.0	0	0.0	6	18.8	11	34.4
3. Bayboro	16	84.2	3	15.8	7	23.3	4	13.3
4. Oriental	7	87.5	1	12.5	6	24.0	11	44.0
5. Arapahoe	34	85.0	6	15.0	7	11.5	14	23.0
Total/Average	82	89.1	10	10.9	27	16.9	41	25.6

*Percents based on those who participate.

Table 12. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Hunting	Yes		No		Don't Participate		N.R.	
	#	%	#	%	#	%	#	%
1. Goose Creek	7	100.0	0	0.0	1	8.3	4	33.3
2. Vandemere	13	92.9	1	7.1	5	15.6	13	40.6
3. Bayboro	14	87.5	2	12.5	7	23.3	7	23.3
4. Oriental	6	85.7	1	14.3	6	24.0	12	48.0
5. Arapahoe	32	94.1	2	5.9	13	21.3	14	23.0
Total/Average	72	92.3	6	7.7	32	20.0	50	31.3

*Percents based on those who participate.

Table 13. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Swimming	<u>Yes</u>		<u>No</u>		<u>Don't Participate</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%
1. Goose Creek	8	100.0	0	0.0	0	0.0	4	33.3
2. Vandemere	7	70.0	3	30.0	6	18.8	16	50.0
3. Bayboro	7	63.6	4	36.4	10	33.0	9	30.0
4. Oriental	4	57.1	3	42.9	5	20.0	13	52.0
5. Arapahoe	15	55.6	12	44.4	14	23.0	20	32.8
Total/Average	41	65.1	22	34.9	35	21.9	62	38.8

*Percents based on those who participate.

Table 14. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Boating	<u>Yes</u>		<u>No</u>		<u>Don't Participate</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%
1. Goose Creek	10	100.0	0	0.0	0	0.0	2	16.7
2. Vandemere	11	73.3	4	26.7	5	15.6	12	37.5
3. Bayboro	10	62.5	6	37.5	6	20.0	8	26.7
4. Oriental	4	66.7	2	33.3	7	28.0	12	48.0
5. Arapahoe	18	69.2	8	30.8	16	26.2	19	31.1
Total/Average	53	63.9	20	24.0	34	21.3	53	33.1

*Percents based on those who participate.

Table 15. Question 6: If you use an insect repellent on yourself, how satisfied are you with the protection it gives?

	<u>Very Satisfied</u>		<u>Satisfied</u>		<u>Not Satisfied</u>		<u>Don't Use</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	4	33.3	5	41.7	1	8.3	2	16.7	0	0.0
2. Vandemere	2	6.3	12	37.5	7	21.9	10	31.3	1	3.1
3. Bayboro	1	3.3	11	36.7	12	40.0	5	16.7	1	3.3
4. Oriental	1	4.0	5	20.0	7	28.0	11	44.0	1	4.0
5. Arapahoe	3	4.9	20	32.8	16	26.2	20	32.8	2	3.3
Total/Average	11	6.9	53	33.1	43	26.9	48	30.0	5	3.1

Table 16. Question 7: Do you think there should be more community effort devoted to the control of biting insects in this area?

	<u>More</u>		<u>Less</u>		<u>Adequate</u>		<u>No Opinion</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	10	83.3	0	0.0	1	8.3	1	8.3	0	0.0
2. Vandemere	25	78.1	0	0.0	1	3.1	4	12.5	2	6.3
3. Bayboro	19	63.3	2	6.7	3	10.0	5	16.7	1	3.3
4. Oriental	17	68.0	0	0.0	4	16.0	3	12.0	1	4.0
5. Arapahoe	45	73.8	0	0.0	7	11.5	7	11.5	2	3.3
Total/Average	116	72.5	2	1.3	16	10.0	20	12.5	6	3.8

Table 17. Question 8: How much would it be "worth" to you to have better control of biting insects?

	<u>\$5 - 10</u>		<u>\$2 - 5</u>		<u>\$1</u>		<u>Nothing</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	5	41.7	3	25.0	1	8.3	1	8.3	2	16.7
2. Vandemere	15	46.9	3	9.4	5	15.6	5	15.6	4	12.5
3. Bayboro	9	30.0	6	20.0	1	3.3	8	26.7	6	20.0
4. Oriental	8	32.0	6	24.0	2	8.0	5	20.0	4	16.0
5. Arapahoe	20	32.8	20	32.8	2	3.3	11	18.0	8	13.1
Total/Average	57	35.6	38	23.8	11	6.9	30	18.8	24	15.0

Table 18. Question 9: If you are a property owner, do you think your property would increase in value if there were fewer biting insects?

	<u>Yes</u>		<u>No</u>		<u>Undecided</u>		<u>Property Owner</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	7	58.3	3	25.0	2	16.7	0	0.0	0	0.0
2. Vandemere	23	71.9	2	6.3	7	21.9	0	0.0	0	0.0
3. Bayboro	16	55.2	7	24.1	6	20.0	1	3.3	0	0.0
4. Oriental	12	48.0	8	32.0	4	16.0	1	4.0	0	0.0
5. Arapahoe	26	47.3	20	36.4	9	16.4	2	3.3	4	6.6
Total/Average	84	55.3	40	26.3	28	18.4	4	2.5	4	2.5

*Percents based on number of property owners.

Table 19. Question 10: If you are a visitor to this area, would you come more often if there were fewer biting insects?

	<u>Yes</u>		<u>No</u>		<u>Undecided</u>		<u>Not a Visitor</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	0	0.0	0	0.0	12	100.0	0	0.0
2. Vandemere	0	0.0	0	0.0	0	0.0	32	100.0	0	0.0
3. Bayboro	0	0.0	0	0.0	0	0.0	30	100.0	0	0.0
4. Oriental	0	0.0	0	0.0	0	0.0	25	100.0	0	0.0
5. Arapahoe	1	100.0	0	0.0	0	0.0	60	98.4	0	0.0
Total/Average	1	100.0	0	0.0	0	0.0	159	99.4	0	0.0

*Percents based on the number of visitors.

Table 20. Question 11: To what extent do you think each of the following is a problem in this area?

Biting Insects	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	8	66.7	4	33.3	0	0.0	0	0.0	0	0.0
2. Vandemere	23	71.9	8	25.0	1	3.1	0	0.0	0	0.0
3. Bayboro	10	33.3	14	46.7	4	13.3	1	3.3	1	3.3
4. Oriental	12	48.0	11	44.0	1	4.0	0	0.0	1	4.0
5. Arapahoe	18	29.5	27	44.3	10	16.4	0	0.0	6	9.8
Total/Average	71	44.4	64	40.0	16	10.0	1	0.6	8	5.0

Table 21. Question 11: To what extent do you think each of the following is a problem in this area?

Waste Disposal	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	2	16.7	2	16.7	2	16.7	1	8.3	5	41.7
2. Vandemere	13	4.6	9	28.1	3	9.4	3	9.4	4	12.5
3. Bayboro	14	46.7	7	23.3	3	10.0	3	10.0	3	10.0
4. Oriental	7	28.0	8	32.0	4	16.0	0	0.0	6	24.0
5. Arapahoe	12	19.7	16	26.2	14	23.0	4	6.6	15	24.6
Total/Average	48	30.0	42	26.3	26	16.3	11	6.9	33	20.6

Table 22. Question 11: To what extent do you think each of the following is a problem?

Water Supply	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	2	16.7	2	16.7	3	25.0	5	41.7
2. Vandemere	5	15.6	9	28.1	5	15.6	4	12.5	9	28.1
3. Bayboro	5	16.7	10	33.3	6	20.0	6	20.0	3	10.0
4. Oriental	3	12.0	7	28.0	3	12.0	4	16.0	8	32.0
5. Arapahoe	7	11.5	12	19.7	13	21.3	14	23.0	15	24.6
Total/Average	20	12.5	40	25.0	29	18.1	31	19.4	40	25.0

Table 23. Question 11: To what extent do you think each of the following is a problem in this area?

Air Pollution	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	2	16.7	2	16.7	3	25.0	5	41.7
2. Vandemere	5	15.6	6	18.8	8	25.0	5	15.6		25.0
3. Bayboro	3	10.0	4	13.3	11	36.7	6	20.0	6	20.0
4. Oriental	2	8.0	4	16.0	7	28.0	3	12.0	9	36.0
5. Arapahoe	5	8.2	17	27.9	19	31.1	5	8.2	15	24.6
Total/Average	15	9.4	33	20.6	47	29.4	22	13.8	43	26.9

Table 24. Question 11: To what extent do you think each of the following is a problem in this area?

Area Beautification	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	4	33.3	3	25.0	1	8.3	4	33.3
2. Vandemere	10	31.3	9	28.1	5	15.6	2	6.3	6	18.8
3. Bayboro	10	33.3	11	36.7	1	3.3	3	10.0	5	16.7
4. Oriental	4	16.0	6	24.0	4	16.0	4	16.0	7	28.0
5. Arapahoe	7	11.5	18	29.5	17	27.6	4	6.6	15	24.6
Total/Average	31	19.4	48	30.0	30	18.8	14	8.8	37	23.1

Table 25. Question 11: To what extent do you think each of the following is a problem in this area?

Water Pollution	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	1	8.3	3	25.0	3	25.0	2	16.7	3	25.0
2. Vandemere	8	25.0	8	25.0	5	15.6	2	6.3	9	28.1
3. Bayboro	9	30.0	7	23.3	6	20.0	4	13.3	4	13.3
4. Oriental	6	24.0	5	20.0	5	20.0	1	4.0	8	32.0
5. Arapahoe	7	11.5	19	31.1	15	24.6	3	4.9	17	27.9
Total /Average	31	19.4	42	26.3	34	21.3	12	7.5	41	25.0

Table 26. Question 11: To what extent do you think each of the following is a problem in this area?

Housing	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	3	25.0	0	0.0	4	33.3	5	41.7
2. Vandemere	5	15.6	8	25.0	5	15.6	6	18.8	8	25.0
3. Bayboro	3	10.0	11	36.7	6	20.0	4	13.3	6	20.0
4. Oriental	1	4.0	8	32.0	5	20.0	1	4.0	10	40.0
5. Arapahoe	2	3.3	12	19.7	21	34.4	8	13.1	18	29.5
Total /Average	11	6.9	42	26.3	37	23.1	23	14.4	47	29.4

Table 27. Question 11: To what extent do you think of the following is a problem to this area?

Protection of the Environment	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	1	8.3	2	16.7	3	25.0	6	50.0
2. Vandemere	5	15.6	11	34.4	5	15.6	3	9.4	8	25.0
3. Bayboro	4	13.3	11	36.7	7	23.3	2	6.7	6	20.0
4. Oriental	5	20.0	4	16.0	5	20.0	1	4.0	10	40.0
5. Arapahoe	8	13.1	20	32.8	12	19.7	3	4.9	18	29.5
Total /Average	22	13.8	47	29.4	31	19.4	12	7.5	48	30.0

Table 28. Question 12: Which of the following are you?

	<u>Resident</u>		<u>Non-Resident Property Owner</u>		<u>Visitor</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%
1. Goose Creek	12	100.0	0	0.0	0	0.0	0	0.0
2. Vandemere	32	100.0	0	0.0	0	0.0	0	0.0
3. Bayboro	29	96.7	1	3.3	0	0.0	0	0.0
4. Oriental	24	96.0	1	4.0	0	0.0	0	0.0
5. Arapahoe	58	95.1	0	0.0	1	1.6	2	3.3
Total/Average	155	96.9	2	1.3	1	0.6	2	1.3

Table 29. Question 13: Your sex?

	<u>Male</u>		<u>Female</u>		<u>N.R.</u>	
	#	%	#	%	#	%
1. Goose Creek	9	75.0	3	25.0	0	0.0
2. Vandemere	24	75.0	8	25.0	0	0.0
3. Bayboro	27	90.0	3	10.0	0	0.0
4. Oriental	17	68.0	7	28.0	1	4.0
5. Arapahoe	46	75.4	13	21.3	2	3.3
Total/Average	123	76.9	34	21.3	3	1.9

Table 30. Question 14: Your age?

	<u>18 - 25</u>		<u>25 - 40</u>		<u>Over 40</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%
1. Goose Creek	0	0.0	2	16.7	10	83.3	0	0.0
2. Vandemere	0	0.0	2	6.2	30	93.8	0	0.0
3. Bayboro	1	3.3	5	16.7	22	73.3	2	6.7
4. Oriental	0	0.0	3	12.0	21	84.0	1	4.0
5. Arapahoe	0	0.0	8	13.1	50	82.0	3	4.9
Total/Average	1	0.6	20	12.5	133	83.1	6	3.8

APPENDIX IV PENDER COUNTY

Table 1. Responses to the mail survey by area.

	Disbributed	Returned	% Return
1. Hampstead	138	44	31.8
2. Topsail Beach	110	28	25.5
3. Surf City	180	41	22.8
Total	428	113	26.4

Table 2. Question 1: How often are you bothered by biting insects out-of-doors?

	<u>Often</u>		<u>Sometimes</u>		<u>Seldom</u>		<u>Never</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	39	88.6	5	11.4	0	0.0	0	0.0	0	0.0
2. Topsail Beach	20	71.4	6	21.4	1	3.6	0	0.0	1	3.6
3. Surf City	39	95.1	1	2.4	0	0.0	0	0.0	1	2.4
Total/Average	98	86.7	12	10.6	1	0.9	0	0.0	2	1.8

Table 3. Question 2: How often do each of the following insects bother you out-of-doors?

Mosquitoes	<u>Very Often</u>		<u>Quite Often</u>		<u>Once in a while</u>		<u>Hardly Ever</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	24	54.5	13	29.5	6	13.6	0	0.0	1	2.3
2. Topseil Beach	9	32.1	7	25.0	7	25.0	5	17.9	0	0.0
3. Surf City	31	75.6	9	22.0	1	2.4	0	0.0	0	0.0
Total/Average	64	56.6	29	25.7	14	12.4	5	4.4	1	0.9

Table 4. Question 2: How often do each of the following insects bother you out-of-doors?

Yellow flies	<u>Very Often</u>		<u>Quite Often</u>		<u>Once in a while</u>		<u>Hardly Ever</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	14	31.8	15	34.1	13	29.5	1	2.3	1	2.3
2. Topsail Beach	5	17.9	1	3.6	7	25.0	10	35.7	5	17.9
3. Surf City	4	9.8	8	19.5	13	31.7	10	24.4	6	14.6
Total/Average	23	20.4	24	21.2	33	24.8	21	18.6	12	10.6

Table 5. Question 2: How often do each of the following insects bother you out-of-doors?

Biting gnats	<u>Very Often</u>		<u>Quite Often</u>		<u>Once in a while</u>		<u>Hardly Ever</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	30	68.2	10	22.7	3	6.8	1	2.3	0	0.0
2. Topsail Beach	13	46.4	11	39.3	3	10.7	0	0.0	1	3.6
3. Surf City	16	39.0	11	26.8	11	26.8	3	7.3	0	0.0
Total/Average	59	52.2	32	28.3	17	15.0	4	3.5	1	0.9

Table 6. Question 2: How often do each of the following insects bother you out-of-doors?

Greenheads	<u>Very Often</u>		<u>Quite Often</u>		<u>Once in a while</u>		<u>Hardly Ever</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	4	9.1	11	25.0	16	36.4	8	18.2	5	11.4
2. Topsail Beach	4	14.3	3	10.7	8	28.6	7	25.0	6	21.4
3. Surf City	4	9.8	3	7.3	7	17.1	18	43.9	9	22.0
Total/Average	12	10.6	17	15.0	31	27.4	33	29.2	20	17.7

Table 7. Question 3a: Are mosquitoes as "bad" now as they used to be (10-15 years ago)?

	Not as bad		Same		Worse		Don't know		N.R.	
	#	%*	#	%*	#	%*	#	%	#	%
1. Hampstead	13	44.8	8	27.6	8	27.6	15	34.1	0	0.0
2. Topsail Beach	13	61.9	6	28.6	2	9.5	7	25.0	0	0.0
3. Surf City	5	27.8	6	33.3	7	38.9	23	56.1	0	0.0
Total /Average	31	45.6	20	29.4	17	25.0	45	39.8	0	0.0

*Percentages based on those who could make the comparison.

Table 8. Question 3b: Are other biting flies and gnats as "bad" now as they used to be (10-15 years ago)?

	Not as bad		Same		Worse		Don't know		N.R.	
	#	%*	#	%*	#	%*	#	%	#	%
1. Hampstead	5	19.2	19	73.1	2	7.7	13	29.5	2	4.5
2. Topsail Beach	5	27.8	8	44.4	5	27.8	10	35.7	0	0.0
3. Surf City	3	16.7	7	38.9	8	44.4	23	56.1	0	0.0
Total /Average	13	20.0	34	52.3	18	27.7	46	40.7	2	1.8

*Percentages based on those who could make the comparison.

Table 9. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Yardwork	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Hampstead	43	100.0	0	0.0	0	0.0	1	2.3
2. Topsail Beach	26	100.0	0	0.0	2	7.1	0	0.0
3. Surf City	40	97.6	1	2.4	0	0.0	0	0.0
Total /Average	109	99.1	1	0.9	2	1.8	1	0.9

*Percentages based on those who participate.

Table 10. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Golf	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Hampstead	6	85.7	1	14.3	27	61.4	10	22.7
2. Topsail Beach	1	100.0	0	0.0	18	64.3	9	32.1
3. Surf City	2	33.3	4	66.7	23	56.1	12	29.3
Total /Average	9	64.3	5	35.7	68	60.2	31	27.4

*Percentages based on those who participate.

Table 11. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Fishing	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Hampstead	36	100.0	0	0.0	4	9.1	4	9.1
2. Topsail Beach	24	96.0	1	4.0	3	10.7	0	0.0
3. Surf City	32	94.1	2	5.9	4	9.8	3	7.3
Total /Average	92	96.8	3	3.2	11	9.7	7	6.2

*Percentages based on those who participate.

Table 12. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Hunting	Yes		No		Don't Participate		N.R.	
	#	%*	#	%*	#	%	#	%
1. Hampstead	22	100.0	0	0.0	15	34.1	7	15.9
2. Topsail Beach	10	100.0	0	0.0	13	46.4	5	17.9
3. Surf City	13	86.7	2	15.3	18	43.9	8	19.5
Total /Average	45	95.7	2	4.3	46	40.7	20	17.7

*Percentages based on those who participate.

Table 13. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Swimming	<u>Yes</u>		<u>No</u>		<u>Don't Participate</u>		<u>N.R.</u>	
	#	%*	#	%*	#	%	#	%
1. Hampstead	25	92.6	2	7.4	10	22.7	7	15.9
2. Topsail Beach	18	78.3	5	21.7	0	0.0	5	17.9
3. Surf City	23	79.3	6	20.7	7	17.1	5	12.2
Total/Average	66	83.5	13	16.5	17	15.0	17	15.0

*Percentages based on those who participate.

Table 14. Question 5: Do biting insects interfere with any of the following activities in which you participate?

Boating	<u>Yes</u>		<u>No</u>		<u>Don't Participate</u>		<u>N.R.</u>	
	#	%*	#	%*	#	%	#	%
1. Hampstead	27	90.0	3	10.0	8	18.2	6	13.6
2. Topsail Beach	22	100.0	0	0.0	3	10.7	3	10.7
3. Surf City	25	92.6	2	7.4	8	19.5	6	14.6
Total/Average	74	93.7	5	6.3	19	16.8	15	13.3

*Percentages based on those who participate.

Table 15. Question 6: If you use an insect repellent on yourself, how satisfied are you with the protection it gives?

	<u>Very Satisfied</u>		<u>Satisfied</u>		<u>Not Satisfied</u>		<u>Don't Use</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	0	0.0	14	31.8	27	61.4	2	4.5	1	2.3
2. Topsail Beach	0	0.0	8	28.6	15	53.6	5	17.9	0	0.0
3. Surf City	1	2.4	8	19.5	23	56.1	7	17.1	2	4.9
Total/Average	1	0.9	30	26.5	65	57.5	14	12.4	3	2.7

Table 16. Question 7: Do you think there should be more community effort devoted to the control of biting insects in this area?

	<u>More</u>		<u>Less</u>		<u>Adequate</u>		<u>No Opinion</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	38	86.4	1	2.3	1	2.3	1	2.3	3	6.8
2. Topsail Beach	22	78.6	0	0.0	4	14.3	1	3.6	1	3.6
3. Surf City	38	92.7	0	0.0	0	0.0	3	7.3	0	0.0
Total/Average	98	86.7	1	0.9	5	4.4	5	4.4	4	3.5

Table 17. Question 8: How much would it be "worth" to you to have better control of biting insects in this area?

	<u>\$5 - 10</u>		<u>\$2 - 5</u>		<u>\$1</u>		<u>Nothing</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	27	61.4	7	15.9	2	4.5	1	2.3	6	13.6
2. Topsail Beach	9	32.1	5	17.9	4	14.3	3	10.7	7	25.0
3. Surf City	22	53.7	9	22.0	3	7.3	4	9.8	3	7.3
Total/Average	58	51.3	21	18.6	9	8.0	8	7.1	16	14.2

Table 18. Question 9: If you are a property owner, do you think your property would increase in value if there were fewer biting insects?

	<u>Yes</u>		<u>No</u>		<u>Undecided</u>		<u>Not a Property Owner</u>		<u>N.R.</u>	
	#	%*	#	%*	#	%*	#	%	#	%
1. Hampstead	30	81.1	6	16.2	1	2.7	3	6.8	0	0.0
2. Topsail Beach	11	44.0	8	32.0	6	24.0	3	10.7	0	0.0
3. Surf City	19	73.1	3	11.5	4	15.4	12	29.3	3	7.3
Total/Average	60	68.2	17	19.3	11	12.5	18	15.9	3	2.7

*Percents based on number of property owners.

Table 19. Question 10: If you are a visitor to this area, would you come more often if there were fewer biting insects?

	<u>Yes</u>		<u>No</u>		<u>Undecided</u>		<u>Not a Visitor</u>		<u>N.R.</u>	
	#	%*	#	%*	#	%*	#	%	#	%
1. Hampstead	0	0.0	0	0.0	0	0.0	44	100.0	0	0.0
2. Topsail Beach	0	0.0	0	0.0	0	0.0	27	96.4	1	3.6
3. Surf City	1	50.0	1	50.0	0	0.0	39	95.1	0	0.0
Total/Average	1	50.0	1	50.0	0	0.0	110	97.3	1	0.9

*Percentages based on number of visitors.

Table 20. Question 11: To what extent do you think each of the following is a problem in this area?

Biting Insects	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	36	81.8	7	15.9	0	0.0	0	0.0	1	2.3
2. Topsail Beach	13	46.4	10	35.7	4	14.3	0	0.0	1	3.6
3. Surf City	24	58.5	14	34.1	2	4.9	0	0.0	1	2.4
Total/Average	73	64.6	31	27.4	6	5.3	0	0.0	3	2.7

Table 21. Question 11: To what extent do you think each of the following is a problem in this area?

Waste Disposal	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	13	29.5	10	22.7	6	13.6	4	9.1	11	25.0
2. Topsail Beach	11	39.3	8	28.6	2	7.1	5	17.9	2	7.1
3. Surf City	13	31.7	10	24.4	7	17.1	4	9.8	7	17.1
Total/Average	37	32.7	28	24.8	15	13.3	13	11.5	20	17.7

Table 22. Question 11: To what extent do you think each of the following is a problem in this area?

Water Supply	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	1	2.3	6	13.6	5	11.4	19	43.2	13	29.5
2. Topsail Beach	0	0.0	3	10.7	5	17.9	18	64.3	2	7.1
3. Surf City	11	26.8	8	19.5	8	19.5	7	17.1	7	17.1
Total/Average	12	10.6	17	15.0	18	15.9	44	38.9	22	19.5

Table 23. Question 11: To what extent do you think each of the following is a problem in this area?

Air Pollution	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	1	2.3	6	13.6	13	29.5	12	27.3	12	27.3
2. Topsail Beach	1	3.6	3	10.7	7	25.0	16	57.1	1	3.6
3. Surf City	2	4.9	3	7.3	15	36.6	12	29.3	9	22.0
Total/Average	4	3.5	12	10.6	35	31.0	40	35.4	22	19.5

Table 24. Question 11: To what extent do you think each of the following is a problem in this area?

Area Beautification	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	8	18.2	12	27.3	7	15.9	9	20.5	8	18.2
2. Topsail Beach	5	17.9	5	17.9	4	14.3	12	42.9	2	7.1
3. Surf City	19	46.3	10	24.4	6	14.6	2	4.9	4	9.5
Total /Average	32	28.3	27	23.9	17	15.0	23	20.4	14	12.4

Table 25. Question 11: To what extent do you think each of the following is a problem in this area?

Water Pollution	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	7	15.9	17	38.5	3	6.8	6	13.6	11	25.0
2. Topsail Beach	5	17.9	1	3.6	10	35.7	10	35.7	2	7.1
3. Surf City	10	24.4	12	29.3	8	19.5	5	12.2	6	14.6
Total/Average	22	19.5	30	26.5	21	18.6	21	18.6	19	16.8

Table 26. Question 11: To what extent do you think each of the following is a problem in this area?

Housing	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	2	4.5	5	11.4	13	29.5	11	25.0	13	29.5
2. Topsail Beach	2	7.1	1	3.6	2	7.1	20	71.4	3	10.7
3. Surf City	5	12.2	7	17.1	10	24.4	10	24.4	9	22.2
Total/Average	9	8.0	13	11.5	25	22.1	41	36.3	25	22.1

Table 27. Question 11: To what extent do you think each of the following is a problem in this area?

Protection of the Environment	<u>Serious</u>		<u>Moderate</u>		<u>Slight</u>		<u>None</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%	#	%
1. Hampstead	9	20.5	14	31.8	6	13.6	5	11.4	10	22.7
2. Topsail Beach	10	35.7	4	14.3	3	10.7	9	32.1	2	7.1
3. Surf City	15	36.6	13	31.7	5	12.2	2	4.9	6	14.6
Total/Average	34	30.0	31	27.4	14	12.4	16	14.2	18	15.9

Table 28. Question 12: Which of the following are you?

	<u>Resident</u>		<u>Not a Property Owner</u>		<u>Visitor</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%
1. Hampstead	43	97.7	1	2.3	0	0.0	0	0.0
2. Topsail Beach	15	53.6	11	39.3	1	3	1	3.6
3. Surf City	37	90.2	2	4.9	1	2.4	1	2.4
Total/Average	95	84.1	14	12.4	2	1.8	2	1.8

Table 29. Question 13: Your sex?

	<u>Male</u>		<u>Female</u>		<u>N.R.</u>	
	#	%	#	%	#	%
1. Hampstead	33	75.0	9	20.5	2	4.5
2. Topsail Beach	18	64.3	10	35.7	0	0.0
3. Surf City	25	61.0	16	39.0	0	0.0
Total/Average	76	67.3	35	31.0	2	1.8

Table 30. Question 14: Your age?

	<u>18 - 25</u>		<u>25 - 40</u>		<u>Over 40</u>		<u>N.R.</u>	
	#	%	#	%	#	%	#	%
1. Hampstead	3	6.8	13	29.5	28	63.6	0	0.0
2. Topsail Beach	0	0.0	10	37.7	17	60.7	1	3.6
3. Surf City	6	14.6	13	31.7	21	51.2	1	2.4
Total/Average	9	8.0	36	31.9	66	58.4	2	1.8

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- UNC-SG-72-01. Lyman, John and W. Rickards. University of North Carolina Sea Grant Program, Annual Report, 1 July 1970 - 30 June 1971. 100 pp.
- UNC-SG-72-02. Wurfel, Seymour W., ed. Attitudes regarding a law of the sea convention to establish an international seabed regime. 143 pp.
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